NUTRITION, MORTALITY, FOOD SECURITY, AND LIVELIHOODS SURVEY BASED ON SMART METHODOLOGY

Western (livelihood zone 5) and Eastern (livelihood zones 7, 8, and 9) Regions of Guatemala's Dry Corridor

August 2015

ACKNOWLEDGMENTS

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ACRONYMS AND ABBREVIATIONS

ACF	Action Contre la Faim
CDR	Crude Death Rate
CSI	Coping Strategies Index
EFSA	Emergency Food Security Assessment
ELCSA	Latin American and Caribbean Food Security Scale
ENCOVI	National Survey of Living Conditions
ENSMI	Maternal and Infant Health National Survey
FANTA	Food and Nutrition Technical Assistance
FEWS NET	Famine Early Warning System Network
GAM	Global Acute Malnutrition
H/A	Height for Age
Icefi	Central American Institute for Fiscal Studies
INE	National Institute of Statistics
INSIVUMEH	National Institute of Seismology, Volcanology, Meteorology and Hydrology
IYCF	Infant and Young Children Feeding
LHZ	Livelihood Zone
MAGA	Ministry of Agriculture, Livestock and Food
MinFin	Ministry of Public Finances
MSPAS	Ministry of Public Health and Social Assistance
MUAC	Mid-Upper Arm Circumference
PPS	Probability proportional to Population Size
SAM	Severe Acute Malnutrition
SESAN	Secretariat for Food and Nutrition Security
SMART	Standardized Monitoring and Assessment of Relief and Transitions
U5DR	Under-five Death Rate
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
W/A	Weight for Age
W/H	Weight for Height
WFP	World Food Programme

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SECTION I

ABSTRACT

Guatemala comprises up to 20 different livelihood zones (LHZ), and 54.9 percent of its population lives in rural areas. Its Dry Corridor suffered a long-term drought in 2014, with no rain during 45 consecutive days in some regions. This drought occurred after the sowing season and was preceded by three years of irregular rains in the region, which increased households' vulnerability to food insecurity and depleted their coping mechanisms. In addition to the 2014 drought, a rust disease affected coffee crops, reducing the number of laborers hired for the harvest.

To assess the nutritional status of children 0-59 months of age and the mortality, health, and food security situation of rural households in Guatemala's Dry Corridor (stratified into LHZ 5 in the Western stratum and LHZ 7, 8, and 9 in the Eastern stratum), a Nutrition, Mortality, Food Security, and Livelihoods Survey was conducted between March 11-27, 2015. The survey was a FEWS NET initiative implemented by Action Contre la Faim (ACF). A brief summary of the findings follows.

Acute malnutrition

Western (LHZ 5)

1.7% Wasting

Eastern (LHZ 7, 8, & 9)

3.1% Wasting

The prevalence of wasting was low in both strata. Boys were more affected than girls in the Western stratum, however.

Stunting

Western (LHZ 5)

62.3% Stunting

Eastern (LHZ 7, 8, & 9)
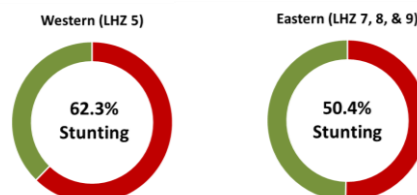
50.4% Stunting

Both strata showed exceptionally high levels of stunting, and the prevalence of stunting was higher among children 24-59 months of age.

Breastfeeding Practices

Nearly 50 percent of children under six months of age were not exclusively breastfed.

Meal frequency was low among children 6-23 months of age.

The vast majority of children 6-23 months of age did not receive a minimum acceptable diet

(Western/Eastern)

Early Initiation of breastfeeding — 74.4% / 72.4%

Exclusive breastfeeding under 6 months — 58.3% / 51.7%
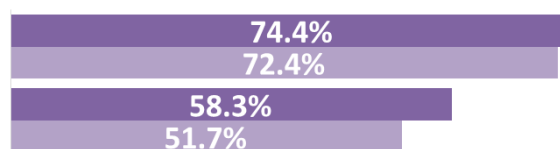
COMPLEMENTARY FEEDING PRACTICES
(Western/Eastern)

Introduction of complementary foods — 63.6% / 84.2%

Minimum Acceptable Diet — 13.8% / 22.6%
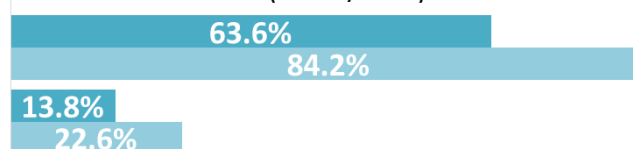
Mortality

The Crude Death Rate (CDR) in the Western and Eastern strata was 0.05 deaths/10,000 people/day and 0.33 deaths/10,000 people/day, respectively. The Under-five Death Rate (U5DR) in the Western and Eastern strata was 0.42 deaths/10,000 children under five years/day, and 0.27 deaths/10,000 children under five years/day, respectively.

Morbidity

Western (LHZ 5)

Diarrhea	Fever	Respiratory infection
27%	43%	52%
73%	57%	48%

Eastern (LHZ 7, 8, & 9)

Diarrhea	Fever	Respiratory infection
30%	46%	63%
70%	54%	37%
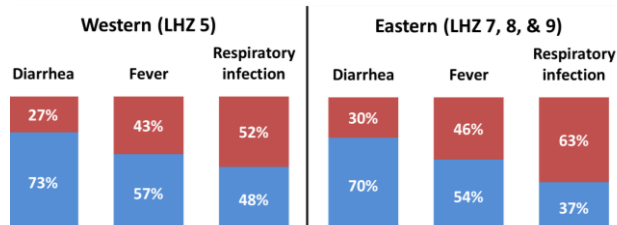
The burden of diarrhea, fever, and respiratory infection was very high in both strata. Three of every four children in the Western stratum who suffered from diarrhea did not receive deworming.

Access to health services

Western (LHZ 5)

Deworming	Measles Vaccination	Vitamin A Supplementation
54%	21%	49%
46%	79%	51%

Eastern (LHZ 7, 8, & 9)

Deworming	Measles Vaccination	Vitamin A Supplementation
37%	9%	23%
63%	91%	77%
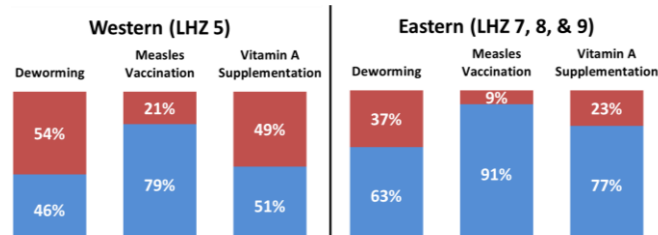
Low coverage of critical health interventions are a proxy indicator of lack of access to health services.

Food Security and Livelihoods

More than half of the severely food insecure households in both strata did not have grain reserves and were adopting emergency coping strategies in March 2015.

Day labor was the main income source for one out of every two households in the Western stratum and for two out of every three households in the Eastern stratum.

Households that had commerce as a main income source tended to be more food secure.

Legend: ■ Food Security ■ Mild Food Insecurity ■ Moderate Food Insecurity ■ Severe Food Insecurity

Western (LHZ 5)

13.5%	Severe
25.6%	Moderate
43.9%	Mild
17.0%	Food Security

Eastern (LHZ 7, 8, & 9)

17.2%	Severe
29.0%	Moderate
48.5%	Mild
5.3%	Food Security
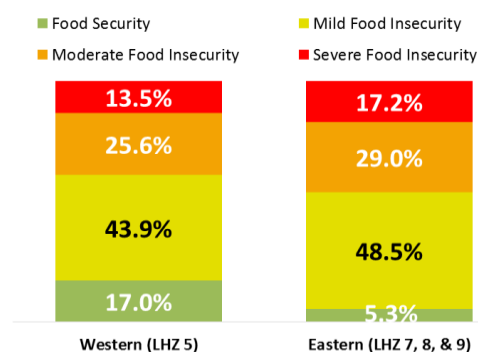
Main Conclusions

- Many communities currently have limited access to health services. This has likely been exacerbated by the interruption of the *Extension of Health Coverage* program.

- It is possible that high levels of morbidity are contributing to the elevated U5DR, particularly in the Western stratum.

- Very few children 6-23 months of age receive a minimum acceptable diet. Meal frequency is consistently low.

- Despite suboptimal infant and young children feeding (IYCF) practices and limited coverage of important health services, the situation has not yet led to increased levels of acute malnutrition.

- Half of severely food insecure households were adopting emergency coping strategies in March 2015. More than one-quarter of households in both strata were classified as moderately food insecure, according to the Latin American and Caribbean Food Security Scale (ELCSA). The situation is likely to deteriorate further until the expected harvest in August.

Main Recommendations

- Promote nutrition education and awareness, and enhance training on appropriate IYCF practices for pregnant and new mothers and health personnel.

- Improve the coverage and quality of basic health services.

- Diversify income sources to reduce the impact of negative shocks on poor households' livelihoods.

- Promote the creation of Community Emergency Funds to improve communities' response capacity.

SECTION II

INTRODUCTION

Guatemala is a country rich in diversity, with its different ethnic groups, a variety of natural resources, and multiple livelihood areas. It is possible to find up to 20 different livelihood zones (LHZ) across the country (Figure 1). Over half (54.9 percent) of the population lives in rural areas (FEWS NET 2009), and 85 percent of the population grows basic grains as the main income-generating activity (WFP et al. 2014).

Figure 1: Livelihood zones in Guatemala
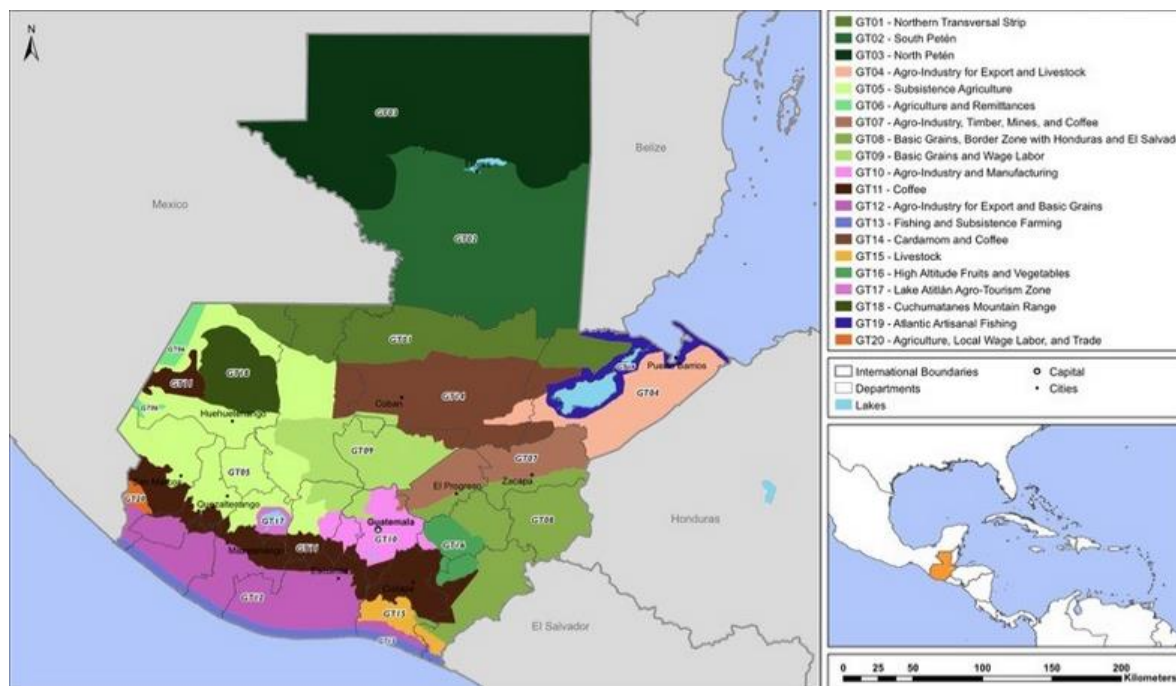
Source: FEWS NET.

Guatemala's Dry Corridor is characterized by cyclical droughts (ACF 2014) that have traditionally affected the departments of El Progreso, Zacapa, Chiquimula, Jalapa, Jutiapa, Santa Rosa, and Baja Verapaz. In recent years, however, the negative effects of droughts have extended to parts of the departments of Quiché, Huehuetenango, Sololá, San Marcos, Totonicapán, and Chimaltenango (WFP et al. 2014).

Figure 2: Map of no rain days in Guatemala from June 1 to July 21, 2014
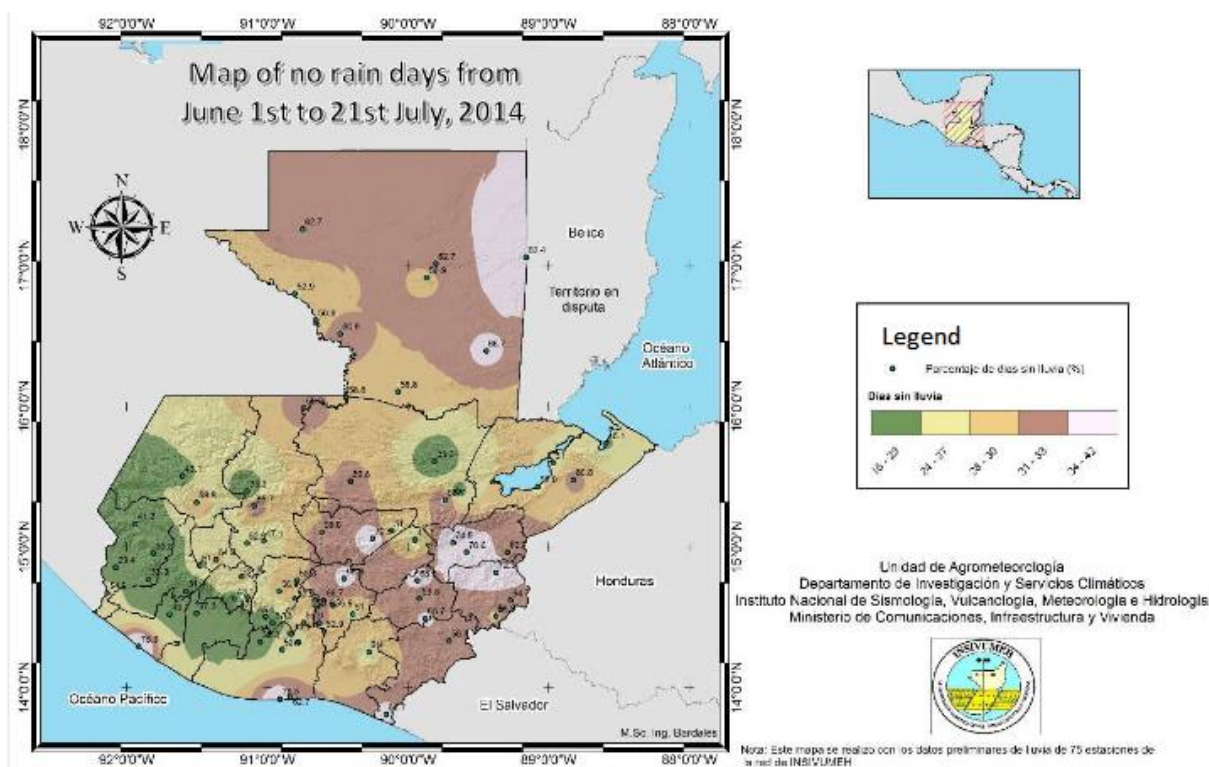
Source: INSIVUMEH (2014).

In 2014, Guatemala's Dry Corridor suffered a long-term drought during July, August, and September, including periods without rain of 45 consecutive days in some regions (WFP et al. 2014) (Figure 2). The drought occurred during a critical phase of crop development (Figure 3), when water availability is a key determinant of yield, resulting in poor harvests.

Figure 3: Seasonal calendar for Guatemala
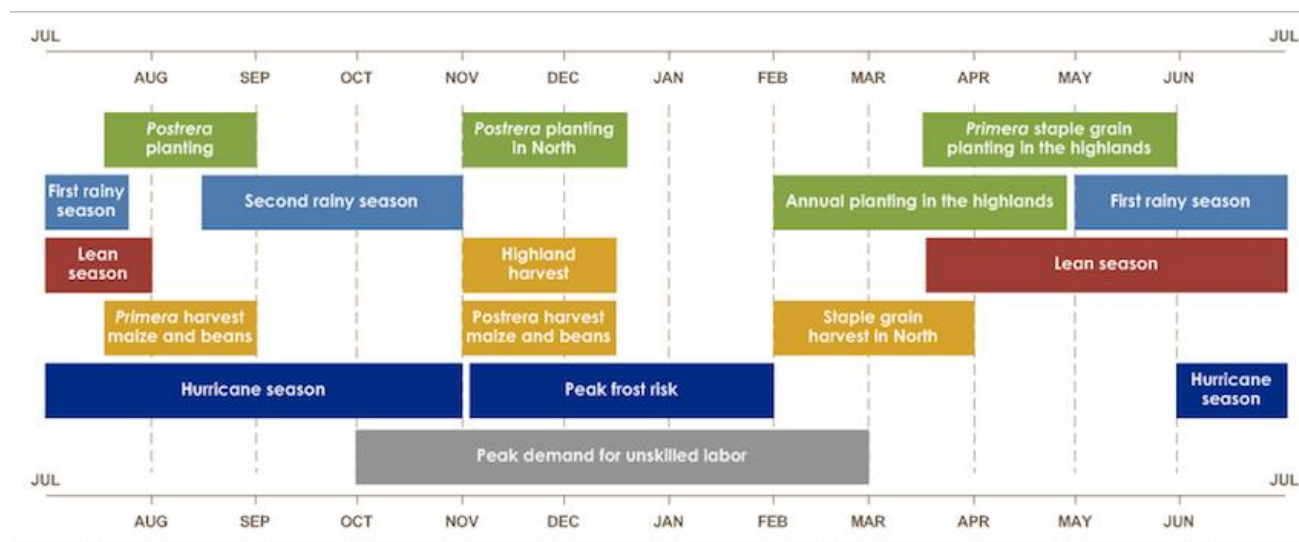
Source: FEWS NET.

Compounding the situation, the 2014 drought was preceded by three years of irregular rains in the region (ACF 2014). It is estimated that out of 275,625 households (1,378,125 persons) affected by the long-term drought, 70 percent lost first cycle crops, and 80 percent had no grain reserves (WFP et al. 2014). As a result, an estimated 175,000 households (875,000 persons) experienced moderate/severe food insecurity in September 2014 (WFP et al. 2014). In addition to the long-term drought in the Dry Corridor, rust, a fungal disease, affected coffee crops. The coffee harvest was reduced by an estimated 40 percent for the 2013-2014 period (SESAN et al. 2013). As a result, many households lost a major source of income between October 2013 and March 2015.

Figure 4: Drought and coffee rust disease in Guatemala
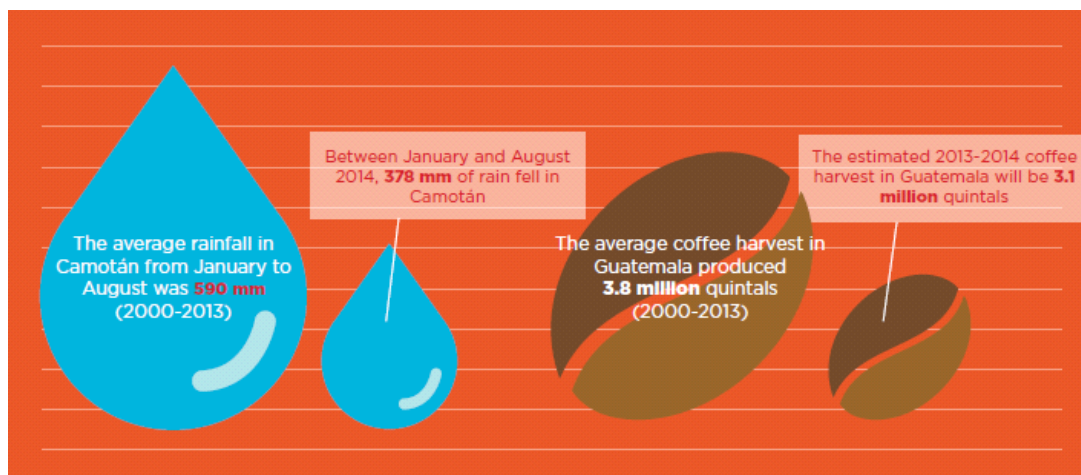
Source: ACF (2014).

All of these factors led to increased levels of food insecurity. In May 2014, FEWS NET forecasted that between June and December 2014, one of every five extremely poor households in some municipalities of the Eastern stratum and the Highlands would be classified as in "Crisis" (Phase 3, IPC 2.0 classification) (FEWS NET 2014). There was considerable concern that the worsening food security situation in these areas might result in increased levels of acute malnutrition among children in affected families. Although anthropometric assessment of children under five years of age was part of the Emergency Food Security Assessment (EFSA) conducted by the World Food Programme (WFP) in September 2014, the sampling methodology was designed to capture food security indicators, not anthropometric ones. Furthermore, the EFSA was not focused on the geographic area of greatest concern within these regions. Very little precise, current, and representative information was thus available to determine whether the aforementioned shocks in the Dry Corridor resulted in a deterioration of the nutrition situation.

SECTION III

SURVEY OBJECTIVES

3.1 General Objective of the Survey

The general objective of the 2015 Nutrition, Mortality, Food Security, and Livelihoods Survey was to assess the nutritional status of children 6-59 months of age, the crude mortality and under five mortality situation, and the health and food security of households in rural areas in Guatemala's Dry Corridor (which comprises LHZ 5, 7, 8, and 9) who were affected by the drought and coffee rust disease of 2014.

3.2 Specific Survey Objectives

The specific objectives of this survey were categorized into six different components: nutrition, infant and young children feeding (IYCF), morbidity, health, mortality, food security, and livelihoods.

Nutrition

- To assess the prevalence of acute malnutrition, defined according to Weight for Height (W/H) Z scores and/or bilateral edema, among children 6-59 months of age.
- To assess the prevalence of acute malnutrition, defined according to Mid-upper Arm Circumference (MUAC) and/or bilateral edema, among children 6-59 months of age.
- To assess the prevalence of stunting, defined according to Height for Age (H/A) Z scores, among children 0-59 months of age.

Morbidity

- To assess the occurrence of diarrhea, fever, and respiratory infection among children 0-59 months of age over the last 15 days**.**

Health

- To estimate the coverage of key health interventions (vitamin A supplementation, deworming, and measles vaccination) among children under five years of age.

Mortality

- To determine the Crude Death Rate (CDR) and Under-five Death Rate (U5DR) with a recall period of 82 days for LHZ 5 and 89 days for LHZ 7, 8, and 9.

Infant and young children feeding (IYCF) practices

- To assess key infant and young child feeding practices among children under two years of age.

Food security and livelihoods

- To measure the prevalence of household food insecurity according to the Latin American and Caribbean Food Security Scale (ELCSA).
- To measure the Coping Strategies Index (CSI) for households.

SECTION IV

SURVEY METHODOLOGY

4.1 Type of Survey

The survey was cross-sectional and used a two-stage cluster approach to sampling; it followed the SMART (Standardized Monitoring and Assessment of Relief and Transitions) methodology. The primary sampling unit was the village and the basic sampling unit was the household.

A household questionnaire contained five components (anthropometry, health, mortality, IYCF, and food security and livelihood).[1] Questions were addressed to a child's primary caregiver. Data collection was carried out between March 11-27, 2015.

4.2 Sampling Universe

Based on FEWS NET's priorities, the survey was simultaneously conducted in two areas: the Dry Corridor was divided into Western and Eastern strata according to FEWS NET's LHZ profiles, as follows (Figure 5):

- **Western stratum:** The departments of Huehuetenango, San Marcos, Totonicapán, and parts of Quiché are included in LHZ 5; only the area of LHZ 5 within the Dry Corridor was included.
  - LHZ 5: Most of Guatemala's indigenous population is concentrated in this LHZ. The main livelihoods are growing basic grains for subsistence and selling labor in agriculture, particularly in the coffee and sugarcane sectors.

- **Eastern stratum:** The departments of Baja Verapaz (LHZ 9), El Progreso (LHZ 7), Zacapa (LHZ 7), Jalapa (LHZ 8), Chiquimula (LHZ 8), Jutiapa (LHZ 8), and other parts of Quiché (LHZ 9) are included in LHZ 7, 8, and 9.
  - LHZ 7: This LHZ is characterized by large crop areas where the population is employed. Residents also grow their own basic grains; in some areas, they are employed in mining and in the manufacture of wooden products.
  - LHZ 8: As in LHZ 5, Zone 8's main livelihood is growing basic grain for subsistence and selling labor in agriculture.
  - LHZ 9: For the majority of the population, the main source of income is selling labor in agriculture, though it is also possible to find the population growing basic grains for subsistence and limited livestock.

LHZ 5 is included in the Western administrative stratum and LHZ 7, 8, and 9 are included in the Eastern administrative stratum (excluding part of Quiché department). Hereafter in this report, "Western" and "Eastern" strata will always refer to this categorization.

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[1] The questionnaire can be found in Annex B.

Figure 5: LHZ included in the sample universe
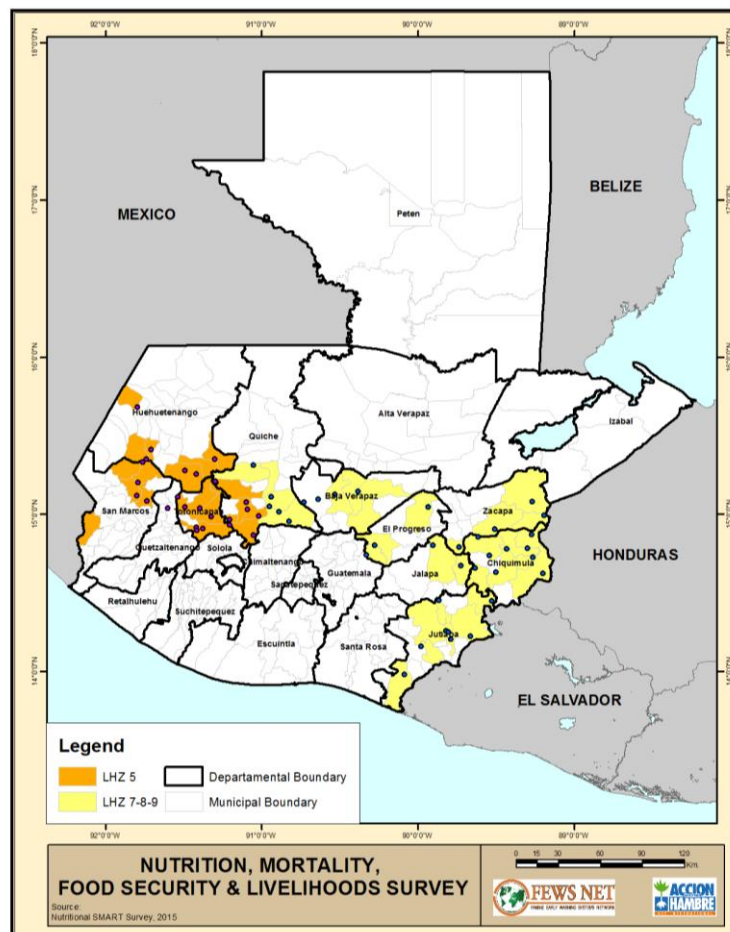
The rural population sampled was selected using the latest National Institute of Statistics (INE) Census Data of 2002. Due to lack of a more recent population census in the country, two different growth rates were applied to achieve an updated estimate of the 2014 rural population for the sampling frame, as presented in Table 1.

Table 1: Sampling universe population projection for 2014, SMART 2015 – ACF

Strata	Population Size			Growth Rate***		Total Census Area
	2002*	2012**	2014***	1990-2012	2012-Now	
Western (LHZ 5)	757,365	775,541	792,603	2.4	2.2	1,014
Eastern (LHZ 7, 8 & 9)	1,455,609	1,490,544	1,523,335	2.4	2.2	3,257

*Note: *INE-Census 2002. ** Annual growth of rural population projection between 2002 - 2012 and 2012 - 2014, for each strata. *** Growth rates from UNICEF (2014).*

4.3 Sampling Frame

4.3.1 Sample size calculation

Sample sizes for each stratum were calculated to estimate the prevalence of Global Acute Malnutrition (GAM) (Table 2) and the CDR (Table 3) using the January 30, 2015 version of ENA software:

Table 2: Sample size for the estimation of GAM, SMART 2015 – ACH

Strata	Children Sample Variables			Household Sample Variables - ENA			SAMPLE SIZE	
	Estimated Prevalence	± Precision	Design Effect	HH Size	% Children < 5 years	% Non response	Children	Households
Western (LHZ 5)	*5.4%	µ 3.0	' 1.5	^ 5.5	^ 13.2%	" 5%	268	431
Eastern (LHZ 7, 8, & 9)	**4.0%	µ 3.0	' 1.5	^ 5.5	^ 13.2%	" 5%	356	574

*Note: *WFP (2014); ** GAM prevalence is expected to increase from 2.4% (WFP 2014) to 4%; µ High precision; ' Default SMART recommendation; ^ ENSMI (2009); " Absence and refuse.*

Table 3: Sample size for the estimation of CDR, SMART 2015 – ACH

Strata	Mortality Sample Variables - ENA			Household Sample Variables - ENA			SAMPLE SIZE	
	Estimated CDR (10,000 pers./day)	± Precision	Design Effect	HH Size	Recall period	% Non response	Population	Households
Western (LHZ 5)	*0.5	µ 0.41	' 1.5	^ 5.5	° 84	" 5%	2,221	425
Eastern (LHZ 7, 8 & 9)	*0.5	µ 0.41	' 1.5	^ 5.5	° 84	" 5%	2,221	425

*Note: *UNICEF (2014); µ High precision; ' Default SMART recommendation; ^ ENSMI (2010); °From Christmas to mid-survey; " Absence and refuse.*

The sample size was calculated separately for each outcome (GAM and CDR), and then the larger of the two sample sizes was chosen as the final sample size to ensure representativeness of both components (Table 4).

Table 4: Final sample size, SMART 2015 – ACF

Strata	FINAL SAMPLE SIZE					
	Children	Households	Cluster	Household/Cluster	Teams	Days for data collection
Western (LHZ 5)	268	431	24	18		6
Eastern (LHZ 7, 8 & 9)	356	574	32	18	4	8
Total	**624**	**1,005**	**56**	**-**		**14**

4.3.2 First stage cluster sampling (selection of communities)

Two independent sampling procedures were performed using ENA to select the clusters in each stratum (24 clusters for the Western strata and 32 for the Eastern strata[2]). ENA employs Probability Proportional to Population Size (PPS) for such cluster sampling and 2014 estimates of the size of the population in each cluster were entered into ENA. As required by the SMART methodology, three to four additional clusters were selected as reserve clusters.

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[2] A list of the 56 cluster locations is presented in Annex C.

4.3.3 Second stage cluster sampling (selection of households)

The basic sampling unit (that is, the household) was defined as follows:

"All persons that slept under one roof the previous night, share the same resources and eat from the same pot. Eating from the same pot was the main factor for the definition of a household, and one person cannot belong to two households."

After a presentation to local authorities and previous authorization, the selection of households was made in the field by the survey team for each cluster. If clusters had more than 150 households, teams segmented the cluster according to administrative divisions of 50-150 households. To select segments, the teams applied PPS. Once the survey area was delimited, teams checked for an updated list of households. If a list was available, simple random sampling was performed to select the households. If a list was not available, systematic random sampling was carried out, enumerating the households in the field following the sampling interval. A total of 18 households per cluster were selected by each team to achieve the required sample size for each stratum.

4.4 Indicators

Target populations varied according to the different indicators and survey objectives (Table 5):

Table 5: Targeted population, interviewees, and indicators, SMART 2015 - ACF

Target Population	Indicators
Children under 5 years old	
0-59 months	H/A, W/A, diarrhea, fever and respiratory infection
*6-59 months	W/H, MUAC and edema
12-59 months	Measles vaccination
25-59 months	Deworming
Children under 24 months	
0-23 months	IYCF Questionnaire
Households	
Household	CDR, U5DR, ELCSA, CSI, Grain Reserves and Main Income Sources

*Note: *Acute malnutrition should target children 6-59 months old (SMART 2006; Sphere Standards 2011).*

4.4.1 Nutrition module

For the nutrition component, the three main indicators were: W/H for acute malnutrition; H/A for stunting; and W/A for underweight. MUAC was also measured as an indicator for acute malnutrition as it has a stronger link with mortality than W/H (de Onis and Habicht 1996; Sphere Standards 2011).

Seca scales, locally made height boards, and MUAC tapes were used to take anthropometric measurements. Weight was measured to the nearest 0.1 kg, height to the nearest 0.1 cm, and MUAC to the nearest 1 mm. All anthropometric equipment was calibrated using standard weights every day prior to data collection.

Table 6 lists the thresholds used for calculating malnutrition prevalence, based on WHO (1997):[3]

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[3] Thresholds for assessing the severity of malnutrition by prevalence ranges can be found in Annex E.

Table 6: Thresholds for assessing malnutrition degrees prevalence in children 0-59 months old

Degree of severity	Acronym	Malnutrition Thresholds			
		Acute Malnutrition (6-59 months)		Stunting (0-59 months)	Underweight (0-59 months)
		W/H	MUAC		
Global	GAM	W/H < -2 Z and/or edema	MUAC < 125 mm and/or edema	H/A < -2 Z	**W/A < -2 Z**
Moderate	MAM	-3 Z ≤ W/H < -2 Z	115 mm ≤ MUAC < 125 mm	-3 Z ≤ H/A < -2 Z	**-3 Z ≤ W/A < -2 Z**
Severe	SAM	W/H < -3 Z and/or edema	MUAC < 115 mm and /or edema	H/A < -3 Z	**W/A < -3 Z**

Source: WHO (1997).

4.4.2 Mortality module

The retrospective mortality module of the questionnaire was built with a recall period that ran from December 24 (Christmas Eve)[4] to the midpoint of the data collection period for each strata (82 days for the Western stratum and 89 days for the Eastern stratum). This module allowed for the assessment of the CDR and the U5DR.[5]

4.4.3 Infant and young children feeding module

The following indicators were calculated in the IYCF module: early initiation of breastfeeding; exclusive breastfeeding under six months; continued breastfeeding at one year of age; continued breastfeeding at two years of age; age-appropriate breastfeeding; introduction of solid, semi-solid, or soft food; minimum dietary diversity; minimum frequency of meals; minimum acceptable diet; and bottle feeding. These indicators allowed identification of the achievement of appropriate feeding practices for children 0-23 months old. WHO (2010) guidelines were used to calculate the indicators.

4.4.4 Food security and livelihood module

Latin American and Caribbean Food Security Scale (ELCSA)

The ELCSA was designed to measure households' food insecurity within Latin American and Caribbean countries, capturing households' perception of their access to food; it does not capture other food security dimensions.

The recall period was from December 24 until the date of the interview, and every question referred to lack of money or other resources. Following FAO (2012) guidelines, the ELCSA scale was calculated separately for adults and for children under 18 years of age (Table 7).

Table 7: Severity degrees threshold for food insecurity

Severity degrees	ELCSA Thresholds	
	Households with only adult members	Households with children under 18 years old
Food security	0	0
Mild food insecurity	1 to 3	1 to 5
Moderate food insecurity	4 to 6	6 to 10
Severe food insecurity	7 to 8	11 to 15

Source: FAO (2012).

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[4] This date was chosen as it was easy for the local population to remember.
[5] Thresholds for assessing the severity of mortality and excess of mortality are presented in Annex D.

Coping Strategies Index

The Coping Strategies Index (CSI) was adopted from WFP (2009) and Maxwell and Caldwell (2008). Composed of 13 questions, this index uses a recall period of seven days.

To calculate the CSI, items are classified into three categories of strategies:[6] stress coping, crisis coping, and emergency coping. The selection of items for each category considered the four most frequent items for stress, the three most frequent items for crisis, and the three most frequent items for emergency (Table 8).

Table 8: Severity degrees for coping strategies, SMART 2015 - ACF

Coping Strategies - Items	Severity Degree*	Western (LHZ 5)	Eastern (LHZ 7, 8 & 9)
Rely on less preferred and less expensive foods	**STRESS**	STRESS	STRESS
Borrow food from a friend or relative	**STRESS**	STRESS	STRESS
Purchase food on credit	**STRESS**	STRESS	STRESS
Gather wild food, hunt, or harvest immature crops	**STRESS**	STRESS	STRESS
Ration the available money and buying ready-made food instead of cooking	**STRESS**	-	-
Consume seed stock held for next season	**CRISIS**	CRISIS	CRISIS
Send children to eat with neighbors	**CRISIS**	-	-
Limit portion size at mealtimes	**CRISIS**	CRISIS	CRISIS
Restrict consumption by adults in order for small children to eat	**CRISIS**	CRISIS	CRISIS
Send household members to beg	**EMERGENCY**	EMERGENCY	-
Feed working members of HH at the expense of non-working members	**EMERGENCY**	EMERGENCY	EMERGENCY
Reduce number of meals eaten in a day	**EMERGENCY**	EMERGENCY	EMERGENCY
Skip entire days without eating	**EMERGENCY**	-	EMERGENCY

*Note: *Classification of severity degrees validated by WFP-Guatemala.*

4.5 Training

Training supervisors and enumerators on SMART methodology procedures is an important step to ensure that the gathered data are of high quality. The 6.5 days for training included: three days of theory, a half day for practical exercises on interviewing and anthropometric measurement, one day for a standardization test, one day for a pilot survey, and one day for overall review and feedback.

Eighteen persons attended the training: four supervisors, three of whom were trained before in SMART methodology by ACF-Canada – the fourth supervisor was the trainer and coordinator of the SMART survey; and 15 enumerators, of whom 12 were selected to comprise the field teams. Three enumerators quit during the training, so two more were hired to cover the gap.

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[6] More detail regarding the calculation of CSI can be found in Annex E.

4.5.1 Theory training

The three days of theory training covered the following topics: objectives of the survey, sample size and household selection, composition of the questionnaire, anthropometric measurements, use of the local event calendar, referral of undernourished children, and ENA software. Before starting the theory training, each enumerator took a pre-test, and a post-test was administered at the end to determine the change in knowledge.

4.5.2 Practical training

The practical component of the training first used role playing regarding how to apply the questionnaire and the possible difficulties that could be encountered in the field. Proper anthropometric measurement techniques were demonstrated on volunteer children, after which all enumerators had the opportunity to practice.

Second, a standardization test was undertaken over the course of one day. For this test, ten children aged four to five years old were each measured twice for weight, height, and MUAC by each enumerator. Each enumerator's results (that is, measurements) were recorded and entered into ENA (training component) to analyze each enumerator's precision and accuracy.

Finally, a one-day dry run took place to practice all survey procedures and test all aspects of the questionnaire. This dry run was carried out in a nonselected cluster in the village of Santa Odilia (Nueva Concepción, Escuintla). Enumerators interviewed five households and measured all eligible children.

At the end of this training, a test was administered to evaluate enumerators' knowledge.

4.5.3 Selection criteria

The following criteria were used to select the 12 enumerators who would form the four teams:

* Pre-/post-test results
* Standardization test results (interviewers and measurers)
* Enumerator's performance during the pilot survey
* Motivation
* Overall attendance

4.6 Survey Monitoring Committee

A committee composed of Action Contre la Faim (ACF), FEWS NET, the Secretariat for Food and Nutrition Security (SESAN), UNICEF, WFP, Plan International, and World Vision was formed to evaluate protocols and provide guidance to improve data collection and survey quality. During data collection, each organization of the monitoring committee supervised a team for at least one day.

4.7 Participative Approach

To ensure acceptance of the survey, a participative approach was carried out and included communication and coordination with the different administrative authorities at the national, regional, and local level.

Government authorities

SESAN supported coordination with other authorities at the regional level to ensure the survey's feasibility. SESAN representatives also participated in the survey, providing technical support and validation of the field procedures.

Likewise, INE provided demographic information and census data of the survey areas to perform the sampling procedure. INE also provided maps of the selected clusters and support for coordination with regional authorities.

Regional authorities

Regional authorities were informed in advance about the survey's implementation in their area. Formal letters signed by SESAN and INE were sent to municipal offices to ensure acceptance of the survey's activities.

Local authorities and community guides

Once the regional authorities were informed, advance calls to local authorities were made to inform the communities about the survey activities and to prepare for the arrival of the teams. Team members were presented and the survey objectives were reviewed upon the team's arrival in the field. Additionally, the support of a community guide was requested to help facilitate movement and acceptance of the team within the community.

4.8 Data Management

Anthropometric data were first entered into ENA software in the field before the team left the cluster. This quality control process, part of the SMART methodology, allowed identification of potentially incorrect measurements using SMART flags and a data plausibility check. In cases where supervisors detected outliers, teams were asked to go back and confirm the anthropometric measurements. The rest of the data collected were entered after the data collection period. The seven supervisors and team leaders/interviewers entered the data.

The statistical analysis was performed using the January 30, 2015 version of ENA and SPSS version 17 (Table 9).

Table 9: Survey data management, SMART 2015 - ACF

Target Population	Data	Software			
		Data Entry	Data Base	Statistic Analysis	
				Descriptives	Secondaries
Children (0-59 months)	Anthropometry, morbidity and health	ENA	ENA/SPSS	ENA	SPSS
Children (0-23 months)	IYCF	CS-Pro	SPSS	SPSS	SPSS
Household	Mortality	CS-Pro	ENA/SPSS	ENA	SPSS
Household	Food Security & Livelihoods	CS-Pro	SPSS	SPSS	SPSS

*Note: * ENA version January 30th, 2015 / CS-Pro version 6.0 / SPSS version 17.*

Prevalence data for nutrition, morbidity, and health indicator results were reported with 95 percent confidence intervals (CI). Data cleaning was performed according to SMART methodology requirements, as shown in Table 10:

Table 10: Exclusion criteria for anthropometric measurements, SMART 2015 – ACF

Exclusion of outlier data	Exclusion Criteria SMART flags*
Wasting	[-3 SD ; +3 SD]
Stunting	[-3 SD ; +3 SD]
Underweight	[-3 SD ; +3 SD]

*Note: *Criteria of the Annex 7.1-Module 7 of the SMART training package.*

4.9 Ethical Considerations

During the survey, wasted children (W/H < -2 Z scores and/or MUAC < 125 mm and/or presence of bilateral edema) were referred to local health authorities to ensure the correct treatment and follow up.

Two forms were completed: one copy was given to the mother and the other was given directly to the municipal health authorities at the end of the day. A third copy was used by the supervisor for follow-up. Likewise, a local authority or a community reference person was informed about the situation of the children and urged to follow up.

SECTION V

RESULTS AND DISCUSSION[7]

5.1 Characteristics, Quality, and Limits of the Survey[8]

Following the SMART criteria, a minimum of 90 percent of the clusters and 80 percent of the children's planned sample size were ensured during data collection (Table 11):

Table 11: Completeness of the planned sample, SMART 2015 – ACF

Strata	SAMPLE COMPLETENESS - SMART-GUATEMALA 2015												
	N of Clusters			N of Households			N of Children (0-59 months)			N of Children (0-23 months)**		Total N of Persons	Average Size of the Household
	Plan	Real*	%	Plan	Real	%	Plan	Real	%	Real	% Over real 0-59	Real	
Western (LHZ 5)	24	23	96%	431	374	87%	268	280	104%	125	45%	2,304	6.2
Eastern (LHZ 7, 8 & 9)	32	31	97%	574	538	94%	356	422	119%	163	39%	3,051	5.7
Total	56	54	96%	1,005	912	91%	624	702	113%	288	41%	5,355	N/A

*Note: *Cluster 22 of the Western stratum (Tzanxan) was cancelled due to local authorities' rejection to participate in the survey; Cluster 21 of the Eastern stratum (Las Pilas) was cancelled due to lack of security. **The survey did not seek representativeness for this age group.*

Two clusters were not surveyed, one due to a total rejection from local authorities to carry out the survey (Tzanxán, Totonicapán) and the other to security reasons, as high levels of crime were reported within the cluster (Las Pilas, Jutiapa). Since the coverage criteria were met, there was no need to use the reserve clusters in either stratum.

ENA's Plausibility Check presents different analyses of the anthropometric measurements. Table 12 summarizes specific quality indicators as well as the overall quality score, all of which are used to evaluate the survey's quality.

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[7] Details regarding the comparability of this survey with other studies are provided in Annex G.
[8] Further information regarding the representativeness and quality of the survey can be found in Annex H.

Table 12: Plausibility report for anthropometric data

Quality indicator	Western (LHZ 5)	Eastern (LHZ 7, 8 & 9)	2 Strata
Children measurement (0-59 months)	280	422	702
Overall Quality Score (%)*	7	4	4
Percentage of estimated ages**	1%	0%	1%
Age ratio of 6-29/30-59 months***	0.97	0.82	0.87
Sex ratio (male/female)****	0.92	1.04	0.99
Digit preference for Weight (%)*****	6	6	4
Digit preference for Height (%)*****	10	11	8
Digit preference for MUAC (%)*****	7	7	6

*Overall Quality Score (0-9 excellent, 10-14 Good, 15-24 acceptable and > 25 problematic).

**Without birth date, age was estimated with an event calendar.

*** Proportion of age ratio 6-29/30-59 should be close to 0,85.

**** Proportion of sex ratio should be close to 1.

*****Digit Preference Score (0-7 excellent, 8-12 Good, 13-20 Acceptable and > 20 problematic).

ENA's Plausibility Check Report rated this survey's quality as excellent in both strata, and indicators of representativeness and digit preference both met the SMART methodology's minimum requirements. It is important to note the slight deviation for the age ratio in the Western stratum (0.97), which should be around 0.85; this is due to a slight lack of representation of some age groups for this stratum, particularly for children 24-35 and 36-47 months old.

The collected samples met the objective of representativeness for acute malnutrition and retrospective mortality respectively and independently for the Western and Eastern strata. Representativeness was not required for other complementary indicators of this survey. Nevertheless, those indicators are useful to characterize local contextual factors.

5.2 Post-shock Situation

5.2.1 Acute malnutrition in children 6-59 months old

Figure 6 represents the distribution of W/H Z scores (red curve) compared with the WHO (2006) international reference population (green curve) for each strata. Kurtosis, skewness, and Shapiro-Wilk tests (data not shown) demonstrated that the W/H Z score data were normally distributed in both strata.

Figure 6: Distribution of W/H Z scores for children 6-59 months old by stratum, SMART 2015 - ACF
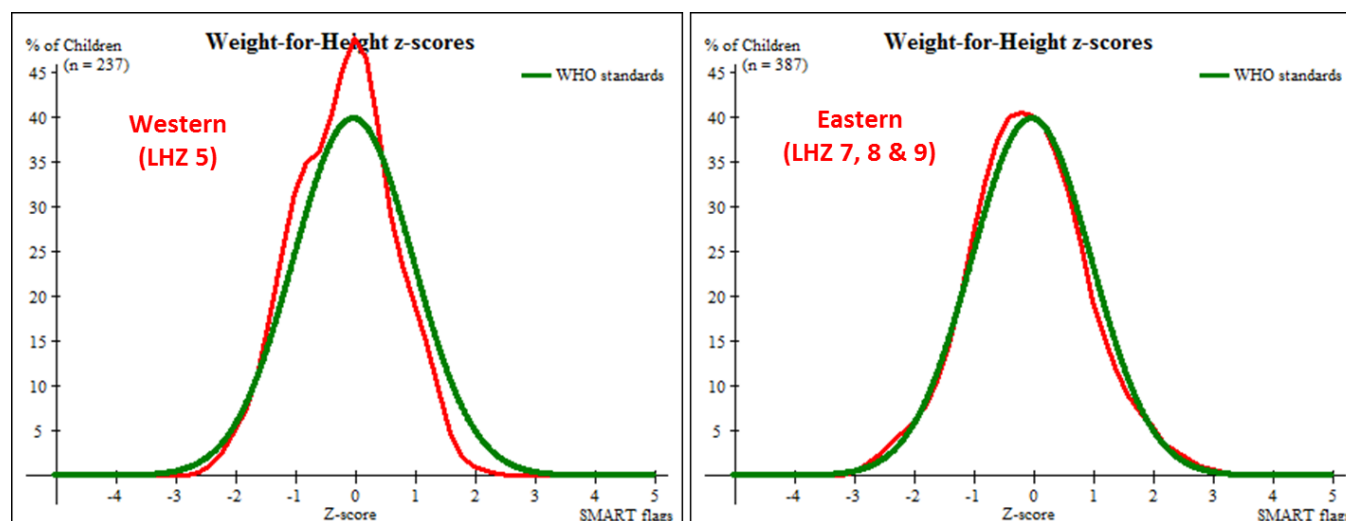
Mean W/H Z score indicators were slightly negative for both strata: -0.18±0.8 for the Western stratum and -0.07±0.97 for the Eastern stratum. The GAM prevalence for the Western stratum was 1.7 percent (95% CI: 0.5-5.5 percent), and 3.1 percent (95% CI: 1.7-5.6 percent) for the Eastern stratum. The severity of the situation was considered low for both strata based on WHO thresholds (<5 percent).

Table 13: Acute malnutrition prevalence (W/H + edemas) and severity degrees for children 6-59 months old by stratum, SMART 2015 - ACH

Strata	N	Acute Malnutrition, Children 6-59 months (W/H + Edemas) % [95% CI]						Bilateral Edema N(%)	
		N	GAM*	N	MAM**	N	SAM***		
Western (LHZ 5)	239	4	1.7% (0.5-5.5)	2	0.8% (0.2-3.5)	2	0.8% (0.1-6.2)	2	0.8%
Eastern (LHZ 7, 8 & 9)	388	12	3.1% (1.7-5.6)	11	2.8% (1.5-5.4)	1	0.3% (0.0-2.0)	1	0.3%

*Note: *GAM (W/H<-2 Z and/or edemas); **MAM (-3 Z<W/H≤-2 Z); ***SAM (W/H<-3 Z and/or edemas).*

The Severe Acute Malnutrition (SAM) prevalences for the Western and Eastern strata were 0.8 percent (95% CI: 0.1-6.2 percent) and 0.3 percent (95% CI: 0.9-2.0 percent), respectively.

Figure 7: Gender differences for GAM (W/H) in children 6-59 months old by stratum, SMART 2015 – ACF
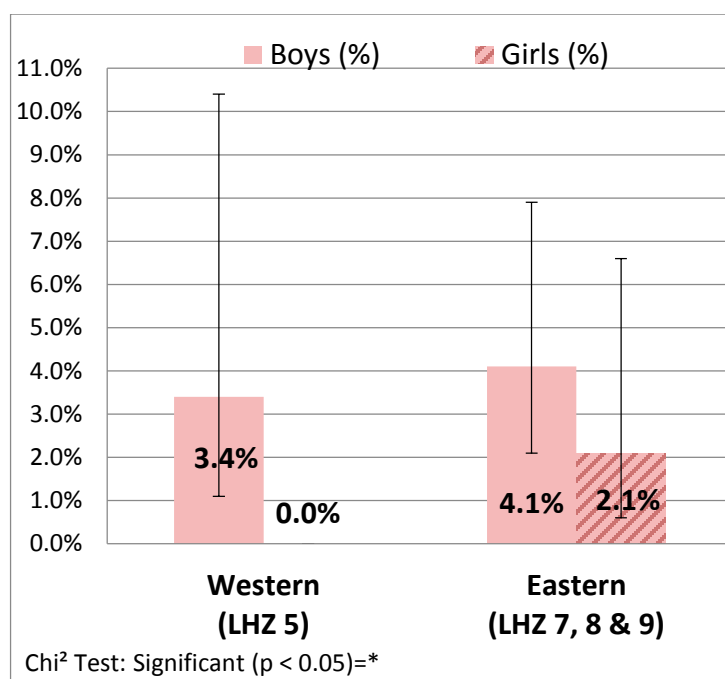
To compare these current findings with previous results,[9] the GAM prevalence between October 2008 and June 2009 was 1.6 percent for rural areas (MSPAS 2010); between October and November, 2012, it was 1.2 percent (SESAN et al. 2013); and in September 2014, it was 3.8 percent (WFP et al. 2014). The delay of the 2014 harvest may explain the slight increase in the GAM prevalence in September 2014. The current prevalence of GAM seems consistent with typical levels in rural areas of Guatemala over the past seven years, however.

In the Western stratum, the GAM prevalence was higher in boys (3.4 percent; 95% CI: 1.1-10.4 percent) than in girls (0.0 percent), but no significant difference between sexes was found in the Eastern stratum (Figure 7). No significant differences in the GAM prevalence among children 6-23 months of age versus children 24-59 months of age were found in either stratum.

As shown in Table 14, the prevalence of GAM, defined according to a MUAC < 125 mm, was 2.5 percent (95% CI: 0.9-6.5 percent) in the Western stratum and 1.3 percent (95% CI: 0.5-3.5 percent) in the Eastern stratum.

Table 14: Acute malnutrition prevalence (MUAC + edemas) and severity degrees for children 6-59 months old by stratum, SMART 2015 - ACF

Strata	N	Acute Malnutrition, Children 6-59 months (MUAC + Edemas) % [95% CI]						Bilateral Edema N(%)	
		N	GAM*	N	MAM**	N	SAM***		
Western (LHZ 5)	243	6	2.5% (0.9-6.5)	4	1.6% (0.5-5.3)	2	0.8% (0.1-6.1)	2	0.8%
Eastern (LHZ 7, 8 & 9)	391	5	1.3% (0.5-3.5)	3	0.8% (0.2-3.3)	2	0.5% (0.1-2.1)	1	0.3%

*Note: *GAM MUAC <125mm and/or edemas; **MAM 125mm<MUAC ≤115mm; ***SAM MUAC <115mm and/or edemas.*

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[9]Please refer to Annex G for further information regarding the comparability of the survey.

Some evidence has shown that MUAC can identify children who are wasted and stunted at the same time (Khara and Dolan 2014). Therefore, inferring the GAM prevalence by MUAC measures could suggest higher cases of children who were stunted and wasted at the same time in the Western stratum, with a resultant multiplied risk of mortality (Khara and Dolan 2014).

5.2.2 Retrospective mortality

With a recall period of 82 days for the Western stratum and 89 days for the Eastern stratum, the respective CDRs were 0.05 deaths/10,000 persons/day and 0.33 deaths/10,000 persons/day (Table 15). The U5DR was 0.42 deaths/10,000 children under five years/day in the Western stratum and 0.27 deaths/10,000 children under five years/day in the Eastern stratum.

Table 15: CDR and U5DR by stratum, SMART 2015 - ACF

| Strata | Recall Period (Days)* | Death Rates (deaths/10,000 pers./day) [95% CI] | | | |
| | | Total Population | | Children under 5 | |
		N total	CDR	N Children	U5DR
Western (LHZ 5)	82	2,304	0.05 (0.01-0.40)	293	0.42 (0.06-3.09)
Eastern (LHZ 7, 8 & 9)	89	3,051	0.33 (0.16-0.70)	423	0.27 (0.03-2.05)

*Note: *Recall period calculated between December 24, 2014 (Christmas Eve) and the mid-data collection day, for each strata.*

According to thresholds specified in the IPC Acute Food Insecurity Classification (v 2.0), the current CDR and U5DR do not indicate a critical mortality situation in the survey areas. According to the Sphere Standards (2011), however, the CDR in the Eastern stratum and the U5DR in the Western stratum are more than double the baseline CDR and U5DR reference values for the Latin America and Caribbean region (0.16/10,000 persons/day and 0.15/10,000 children under five years/day, respectively).

5.2.3 Morbidity and health

In the 15 days preceding the survey in the Western stratum, the occurrence of diarrhea, fever, and respiratory infection (cough and respiratory obstruction) was 26.8 percent, 42.9 percent, and 52.1 percent, respectively. In the Eastern stratum, the corresponding prevalences were 29.9 percent, 46.2 percent, and 63.0 percent.

Table 16: Prevalence of diarrhea, fever, and respiratory infection for children 0-59 months old by stratum, SMART 2015 - ACF

| Strata | Morbidity Occurrence Children 0-59 months [95% CI] | | | | | |
| | Diarrhea | | Fever | | Respiratory Infection | |
	N	%	N	%	N	%
Western (LHZ 5)	75	26.8% (21.9-32.3)	120	42.9% (35.4-50.7)	146	52.1% (44.4-59.8)
Eastern (LHZ 7, 8 & 9)	126	29.9% (24.5-35.8)	195	46.2% (39.2-53.4)	266	63.0% (55.4-70.1)

The morbidity prevalence in both strata was very high and could be related to poor coverage of health services, particularly in the Western stratum. It is also important to highlight that GAM cases with morbidity are related to mortality; thus children

who are severely wasted are 10.1 times (95% CI: 6.53-15.64 times) more likely to die from respiratory infection and 11.56 times (95% CI: 8.63-15.48 times) more likely to die from diarrhea (Olofin et al. 2013).

Focusing on the coverage of key health indicators, only 45.9 percent of children 24-59 months of age in the Western stratum had received deworming in the past six months; 78.7 percent of children 12-59 months of age had been vaccinated against measles; and just over half of children 6-23 months of age had received vitamin A supplementation in the past six months. In the Eastern stratum, the respective coverage levels were 62.9 percent, 76.7 percent, and 91.0 percent.

Table 17: Coverage of deworming, measles vaccination, and vitamin A supplementation by stratum, SMART 2015 - ACF

Strata	Health Coverage [95% CI]					
	Deworming (24-59 months old)		Measles Vaccination (12-59 months old)		Vitamin A Supplementation (6-23 months old)	
	N	%	N	%	N	%
Western (LHZ 5)	68	45.9% (35.9-56.3)	170	78.7% (68.8-86.1)	84	51.2% (40.1-62.2)
Eastern (LHZ 7, 8 & 9)	161	62.9% (54.9-70.2)	313	91.0% (87.0-93.8)	129	76.7% (68.3-83.5)

The scheme defined by the Ministry of Public Health and Social Assistance (MSPAS) includes deworming (for children 24-59 months old) and vitamin A supplementation (for children 6-23 months old) twice a year, and measles vaccination for every child 12-59 months of age.

With respect to links between morbidity and health, a significant association (p=0.004) between the prevalence of diarrhea and receipt of deworming was found in the Western stratum: 75.8 percent of children 24-59 months old who had had diarrhea in the past two weeks had not received deworming medication in the past six months.

SESAN's monitoring system of health services coverage at the national level (MONIMIL) shows that during April 2015, 98.5 percent of health centers did not achieve the minimum criteria required to provide acceptable service. Among other criteria, 63 percent of health centers had critically low stocks of complementary food (Vitacereal) and ready-to-use therapeutic food; 53 percent had critical levels of human resources, and 39 percent had critical levels of vaccine stocks (SESAN et al. 2015).

Cancelation of the Extension of Health Coverage program in February 2015 is forcing health centers to cover these gaps. In the Western stratum, 57.4 percent of health centers were covering this gap, while in the Eastern stratum, only 37.1 percent were doing so[10] (SESAN et al. 2015). Coverage of basic services is clearly still inadequate.

Furthermore, and following a recent study of the cost of nutritional interventions in the primary and second levels of assistance (Icefi et al. 2015), **health services in Guatemala are based on private expenditure, negatively impacting the welfare of the poorest families. Moreover, over the last few years, MSPAS has lacked funding for public health and has relied instead on external credits and international development funds.** This has led to difficulties in planning and executing sustainable long-term projects and has affected the quality of public health services (Icefi et al. 2015).

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[10] These percentages were calculated using data from the departments included in the sample universe and weighting Quiche's data by using the percentage of population that corresponded to each stratum.

Box 1: Post shock situation conclusions

The low prevalence of deworming, vitamin A supplementation, and measles vaccination is a proxy indicator of lack of access to health services. Given MSPAS's financial problems, which interrupted the Extension of Health Coverage program provided by local NGOs, many communities currently have limited access to good health services or access only to poor-quality health services.

The Western stratum's challenging geography (it is mountainous and has vast reliefs) could pose additional barriers to health service access.

The poor situation of children's health does not appear to have resulted in an elevated burden of acute malnutrition, however.

5.3 The 1,000-Day Window of Opportunity

The window of opportunity of a child's first 1,000 days is the period from procreation, pregnancy, birth, and infancy until a child is two years old. This period is an especially important time for preventing stunting in children and its consequences.

5.3.1 Stunting in children 0-59 months old

As shown in Figure 8, the Z scores for the current study (red curve) were displaced to the left of the 2006 WHO reference population, indicating a high prevalence of stunting.

Figure 8: Distribution of H/A Z scores for children 0-59 months old by stratum, SMART 2015 - ACF
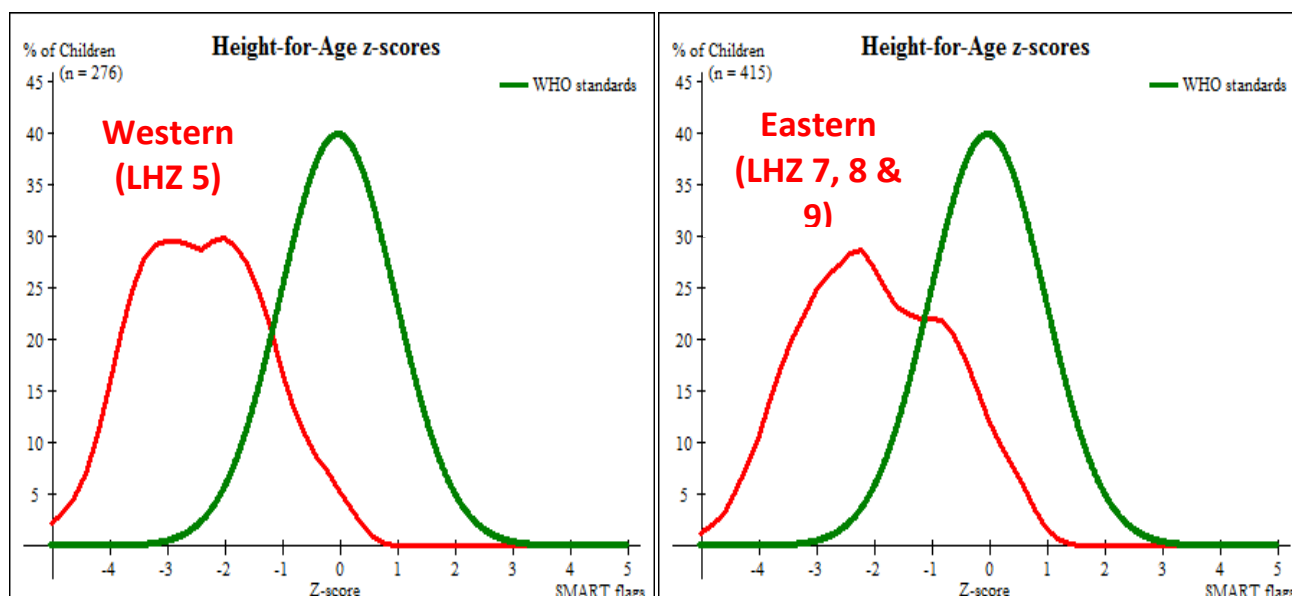
The prevalence of stunting was 62.3 percent (95% CI: 50.5-72.8 percent) in the Western stratum, and 50.4 percent (95% CI: 40.7-60.0 percent) in the Eastern stratum (Table 18). **According to the threshold provided by WHO (1997; 2000), both strata present an emergency situation with respect to stunting prevalence.**

Table 18: Stunting prevalence (H/A) and severity degrees for children 0-59 months old by stratum, SMART 2015 - ACF

Strata	N	Stunting, Children 0-59 months (H/A) % [95% CI]					
		N	Stunting*	N	Moderate Stunting**	N	Severe Stunting***
Western (LHZ 5)	276	172	62.3% (50.5-72.8)	78	28.3% (23.0-34.2)	94	34.1% (24.3-45.3)
Eastern (LHZ 7, 8 & 9)	415	209	50.4% (40.7-60.0)	112	27.0% (22.0-32.7)	97	23.4% (16.5-32.0)

*Global stunting (H/A<-2 Z) **Moderate stunting (-3 Z<H/A≤-2 Z) ***Severe stunting (H/A<-3 Z)*

Compared to children who are not stunted, those who are severely stunted are 6.41 times (95% CI: 3.77-10.89 times) more likely to die and those who are moderately stunted are 2.45 times (95% CI: 1.56-3.87 times) more likely to die (Olofin et al. 2013).

Comparing stunting prevalence with other studies, MSPAS (2010) reported a stunting prevalence of 58.6 percent in rural areas between October 2008 and June 2009; SESAN et al. (2013) found a prevalence of 60.4 percent between October and November 2012. Objective 1 of the Zero Hunger Pact (decreased stunting prevalence by 10 percent) is thus still a long way from being achieved.

Figure 9 shows that the prevalence of stunting in the Eastern stratum was greater among children 24-59 months of age (56.4 percent; 95% CI: 50.0-62.6 percent) compared to children 0-23 months of age (41.2 percent; 95% CI: 33.9-48.1 percent). The same trend was evident in the Western stratum but the difference was not statistically significant. This may confirm that stunted children over 24 months old have lost their window of opportunity. For both strata, no significant differences between sexes were found.

Figure 9: Age group differences for stunting (H/A) in children 0-59 months old by stratum, SMART 2015 – ACF
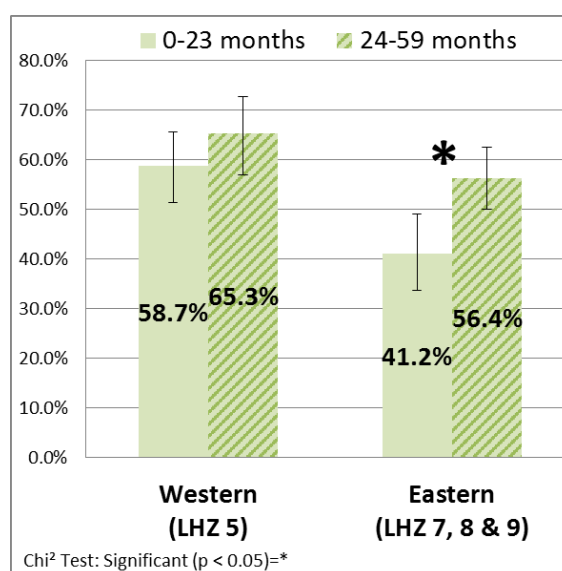
5.3.2 Underweight and overweight for children 0-59 months old

The prevalence of underweight was historically assessed to measure achievement of the Millennium Development Goals, but nowadays it is used less frequently given the difficulties in its interpretation. The prevalence of underweight was over 20 percent for both strata (Table 19). Regarding the severity of underweight, 22.2 percent (95% CI: 16.3-29.5 percent) of children 0-59 months old in the Western stratum were moderately underweight and 4.4 percent (95% CI: 1.9-9.9 percent) were severely underweight; for the Eastern stratum, the prevalence of moderate and severe underweight was 18.1 percent (95% CI: 13.4-24.0 percent) and 4.6 percent (95% CI: 2.4-8.6 percent), respectively. **According to the WHO (1997) threshold, the underweight prevalence indicates an alert situation.**

Table 19: Underweight prevalence (W/A) and severity degrees for children 0-59 months old by stratum, SMART 2015 - ACH

Strata	N	Underweight, Children 0-59 months (W/A) % [95% CI]					
		N	Underweight*	N	Moderate Underweight**	N	Severe Underweight***
Western (LHZ 5)	275	73	26.5% (19.2-35.5)	61	22.2% (16.3-29.5)	12	4.4% (1.9-9.9)
Eastern (LHZ 7, 8 & 9)	414	94	22.7% (16.2-30.8)	75	18.1% (13.4-24.0)	19	4.6% (2.4-8.6)

*Global underweight (W/A<-2 Z) **Moderate underweight (-3 Z<w/A≤-2 Z) ***Severe underweight (2/A<-3 Z)*

The prevalence of overweight/obesity (W/H >2 Z scores) for children 0-59 months old (WHO 2015) in the Western and Eastern strata was 1.5 percent (95% CI: 0.5-4.0 percent) and 4.3 percent (95% CI: 2.6-6.8 percent), respectively.

5.3.3 IYCF-Breastfeeding practices

Global IYCF indicators are: early initiation of breastfeeding; exclusive breastfeeding under six months; continued breastfeeding at one year; introduction of solid, semi-solid, or soft foods; minimum dietary diversity; minimum meal frequency; and minimum acceptable diet (WHO 2010).

As shown in Figure 10, approximately 73 percent of infants 0-23 months of age initiated breastfeeding within the first hour of life. In the Western and Eastern strata, respectively, 58.3 percent and 51.7 percent of infants 0-6 months of age were exclusively breastfed. Almost all of the surveyed population practiced continued breastfeeding at one year (12-15 months of age). Finally, 82.4 percent of children 20-23 months of age in the Western stratum practiced continued breastfeeding at two years of age, while this percentage decreased to 53.6 percent for children in the Eastern stratum.

Figure 10: Breastfeeding indicators by stratum, SMART 2015 – ACF
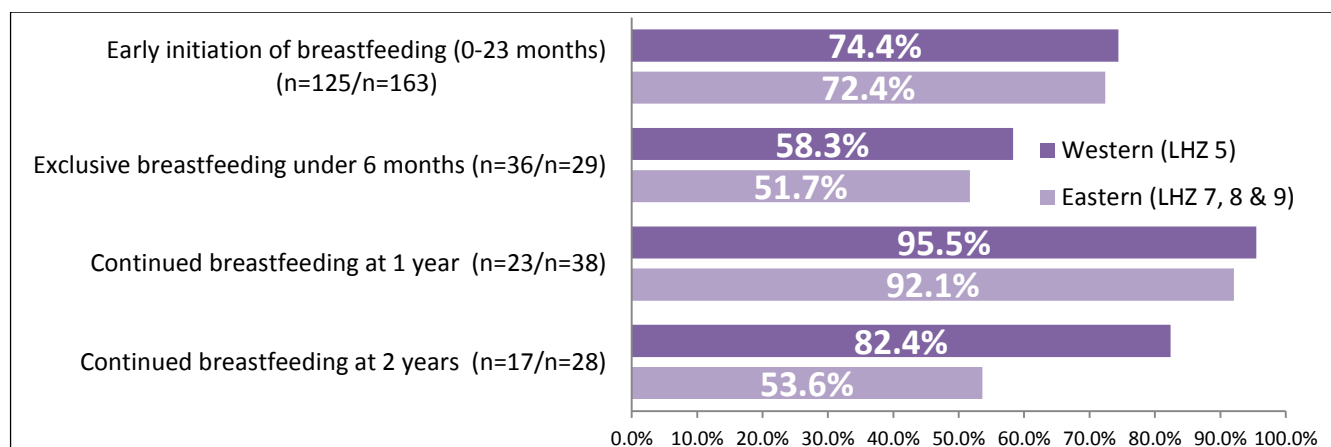
Compared to the Maternal and Infant Health National Survey (ENSMI) 2008-2009, 49.6 percent of mothers at the national level were practicing exclusive breastfeeding for children under six months (MSPAS 2010). The present survey found higher prevalences, though it is important to note that exclusive breastfeeding is a more common practice in rural settings than in urban ones (60.4 percent versus 32.4 percent) (MSPAS 2010).

It should be highlighted that only one of every two children under six months of age was exclusively breastfed. Therefore, children's consumption of other types of liquids could increase their risk of diarrhea.

No significant differences in breastfeeding practices between sexes were found.

5.3.4 IYCF-Complementary feeding practices

Regarding the introduction of solid, semi-solid, or soft food, 84.2 percent of children 6-8 months of age in the Eastern stratum and 63.6 percent in the Western stratum were introduced to complementary food. Minimum dietary diversity[11] was achieved by 62.1 percent and 64.7 percent of children 6-23 months of age in the Western and Eastern strata, respectively.

With respect to the prevalence of minimum meal frequency,[12] 16.1 percent of children 6-23 months old living in the Western stratum and 30.1 percent in the Eastern stratum met the minimum meal frequency.

Finally, the minimum acceptable diet[13] was acquired by 13.8 percent of children 6-23 months old in the Western stratum and by 22.6 percent in the Eastern stratum.

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[11] Children 6-23 months of age who had eaten at least four different types of food during the last 24 hours.
[12] Children 6-23 months of age who had received complementary feeding at least four times during the last 24 hours.
[13] Children 6-23 months of age who had achieved the minimum dietary diversity and the minimum meal frequency in the last 24 hours.

Figure 11: Complementary feeding indicators by stratum, SMART 2015 - ACF
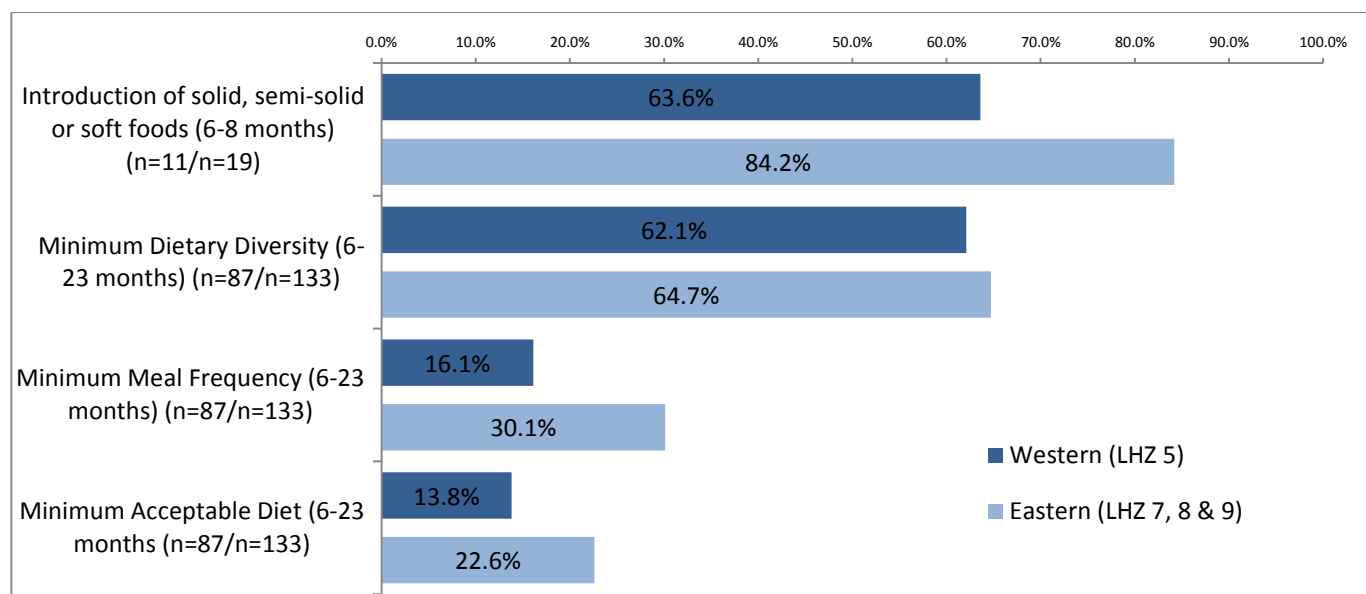
Following the ENSMI 2008-2009 at the national level, 71.3 percent of children 6-8 months of age received complementary feeding at a proper age (MSPAS 2010). For this indicator, the Western stratum was under the national mean, while the Eastern stratum was over it (Figure 11).

It is important to note that only two out of three children between 6-8 months of age from the Western stratum were introduced to complementary feeding at the proper age. Likewise, complementary feeding was not well practiced, not due to lack of diversity but to lack of meal frequency, leading to an unacceptable diet for children 6-23 months of age in both strata.

Lack of meal frequency could be related to household food insecurity and suboptimal caring practices related to migration and labor constraints. During the fieldwork, 31 absences of the head of household were found in the Western stratum and 18 in the Eastern stratum. Although the minimum diversity of diet was achieved for two out of three children, it is unlikely that all of their nutrient needs were met unless fortified-blended food was also incorporated into their diets (FANTA 2015).

A X^2 test revealed no significant differences between sexes for the complementary feeding indicators.

5.3.5 IYCF-Food group consumption and bottle feeding

Regarding children's consumption of different liquids, it is evident from Figure 12 that plain water, *atoles* (rice/oats drinks), and tea/coffee were consumed by more than 50 percent of children 6-23 months old in both the Western and Eastern strata.

Regarding solid, semi-solid, and soft food, porridge, legumes (beans), and sugar were consumed by more than 50 percent of children 6-23 months old in both strata, though in the Western stratum vegetables were also consumed by more than 50 percent of children. Onion and tomatoes were the most commonly consumed vegetables, while consumption of other vegetables was minimal.

Figure 12: Frequency of food group consumption for children 6-23 months old by stratum, SMART 2015 – ACF
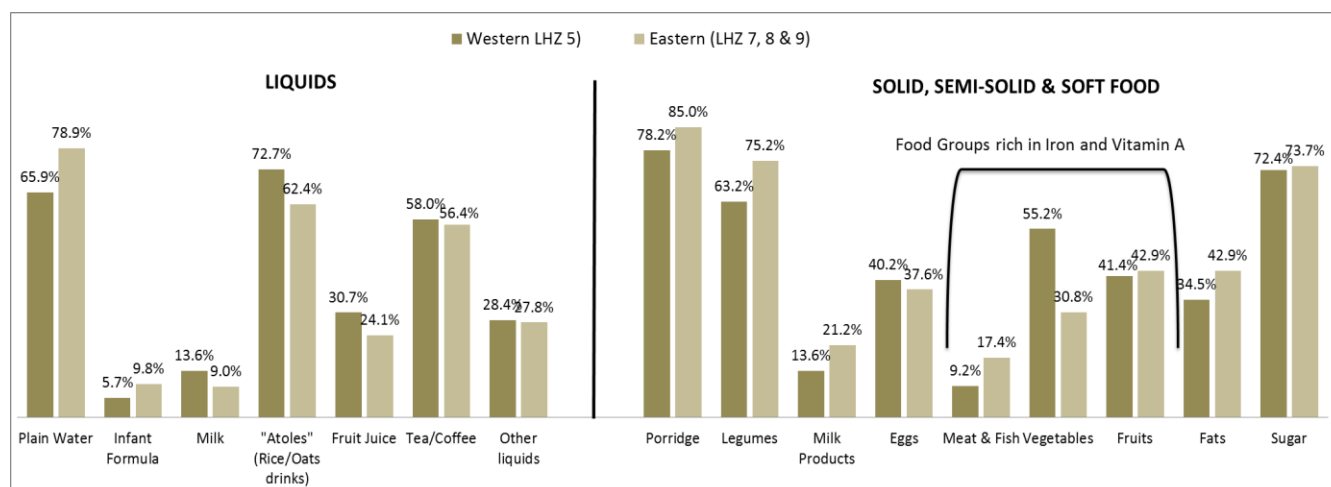
A X^2 test showed that in the Western stratum, males 6-23 months old consumed significantly more milk products than females of the same age (p=0.018); no significant differences were found between sexes for the rest of the food groups.

For the Eastern stratum, no significant differences between sexes were found regarding consumption of various food groups, though eggs and meat and fish were consumed more frequently by males.

Finally, bottle-feeding practices were implemented for 40.8 percent of children 0-23 months old in the Western stratum and for 34.0 percent in the Eastern stratum.

Figure 13: Children 0-23 months old who were bottle fed by stratum, SMART 2015 – ACF
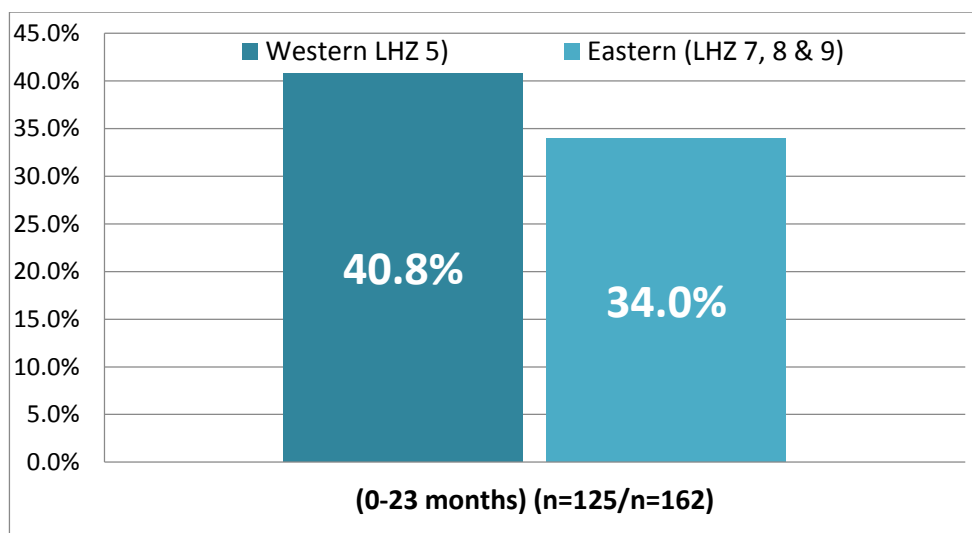
Following ENSMI 2008-2009, at the national level, 38.5 percent of children 0-23 months were bottle fed (MSPAS 2010). In the present survey, more than one out of three children were bottle fed (Figure 13). This could partly explain the low exclusive breastfeeding rates among younger children. Bottle feeding requires excellent hygiene conditions; in Guatemala's rural areas, it could be difficult to ensure hygienic conditions, which could lead to diarrhea infections.

Figure 14: GAM (W/H and MUAC), stunting (H/A), and underweight (W/A) prevalence for children 0-59 months old by strata, SMART 2015 – ACH
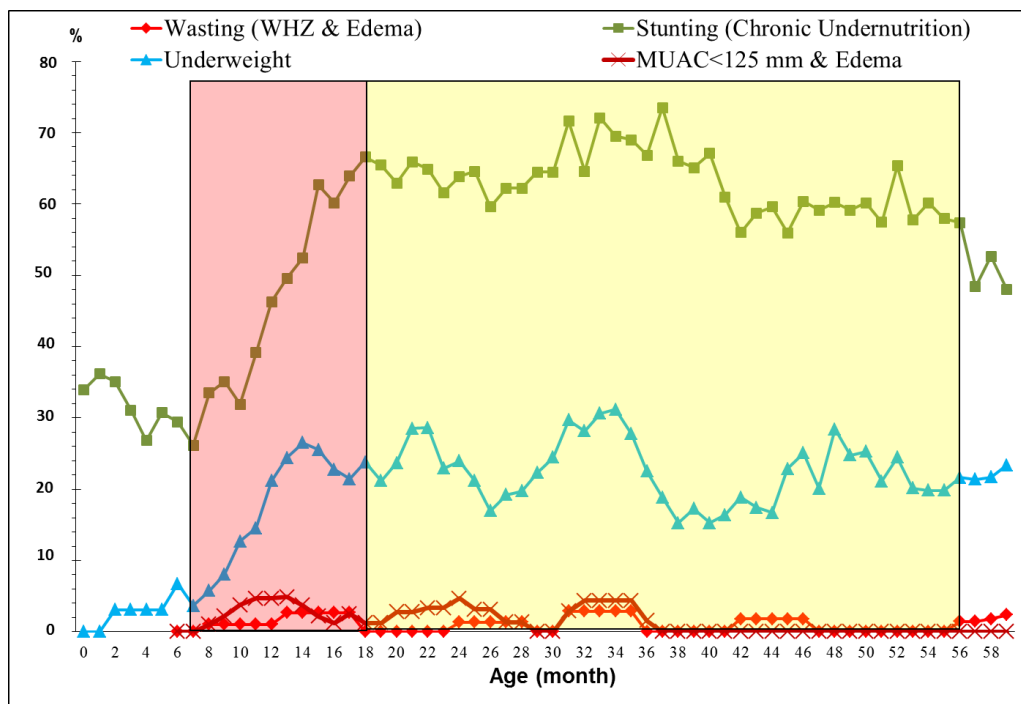
Note: Five-month moving average (WHO Growth Standard).

Box 2: 1,000-day window of opportunity conclusions

Figure 14 indicates that approximately one out of three children of 0-6 months of age in the rural areas of Guatemala's Dry Corridor suffer low H/A. Exclusive breastfeeding is only ensured for half of children under six months, which could lead to a high risk of diarrhea infection for the other half.

Starting from 6-18 months of age, the exponential rise in stunting prevalence appears to be related to complementary feeding. Introduction of complementary feeding for children 6-8 months of age is only practiced by two out of three children in the Western stratum.

Two out of every three children 6-23 months of age received the minimum dietary diversity, but nutrient requirements are still unlikely to be met if fortified-blended flour is not consumed. Meal frequency is very low for both strata (16.1 percent for the Western stratum and 30.1 percent for the Eastern stratum). For all, both previous factors reflect a poor diet in terms of quality and quantity.

After children are 18 months old, stunting prevalence seems to plateau between 60-70 percent, confirming the significant window of opportunity to prevent stunting between 0-23 months old.

5.4 Present Situation and Future Outlook

5.4.1 Food security and livelihoods

The ELCSA measures household food insecurity, capturing households' perception of their access to food. It was calculated separately for households with only adult members (ELCSA ≥18) and for households with children under 18 years old (ELCSA <18), following FAO (2012). This enables determination of whether households with children under 18 years old present a higher and more severe prevalence of food insecurity.

The CSI found that 76.6 percent of households in the Western stratum had adopted at least one coping strategy, whether stress, crisis, or emergency; for the Eastern stratum, this percentage increased to 79.2 percent. Notably, 30.7 percent of households in the Eastern stratum and 22.8 percent in the Western stratum were adopting emergency strategies (Figure 15).

By category, the most frequently adopted coping strategies by households in both strata were:

- Stressed: "Rely on less preferred and less expensive foods"
- Crisis: "Limit portion sizes at mealtime"
- Emergency: "Reduce the number of meals eaten in a day"

Figure 15: ELCSA ≥18 and ELCSA <18 and CSI by stratum, SMART 2015 - ACH
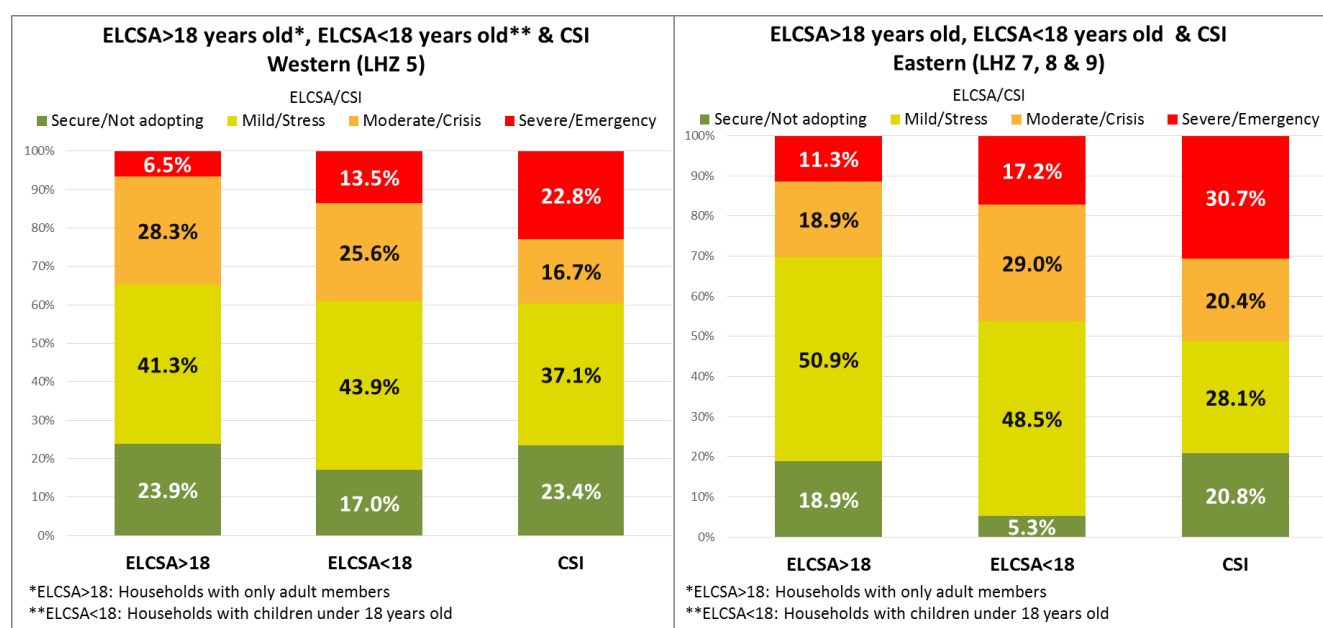
FEWS NET reports show a deterioration of food security outcomes between 2011 and 2015. Since 2011, several consecutive shocks have negatively affected food security and eroded impacted households' resilience, resulting in their use of negative coping strategies and a gap in their food and income.

An association was found between the CSI and ELCSA <18 years old for the Western stratum (p<0.000) and the Eastern stratum (p<0.000). Households with more severe food insecurity tended to apply more severe coping strategies, while food secure households tended not to apply coping strategies.

Figure 16: ELCSA <18 by CSI for each stratum, SMART 2015 - ACF
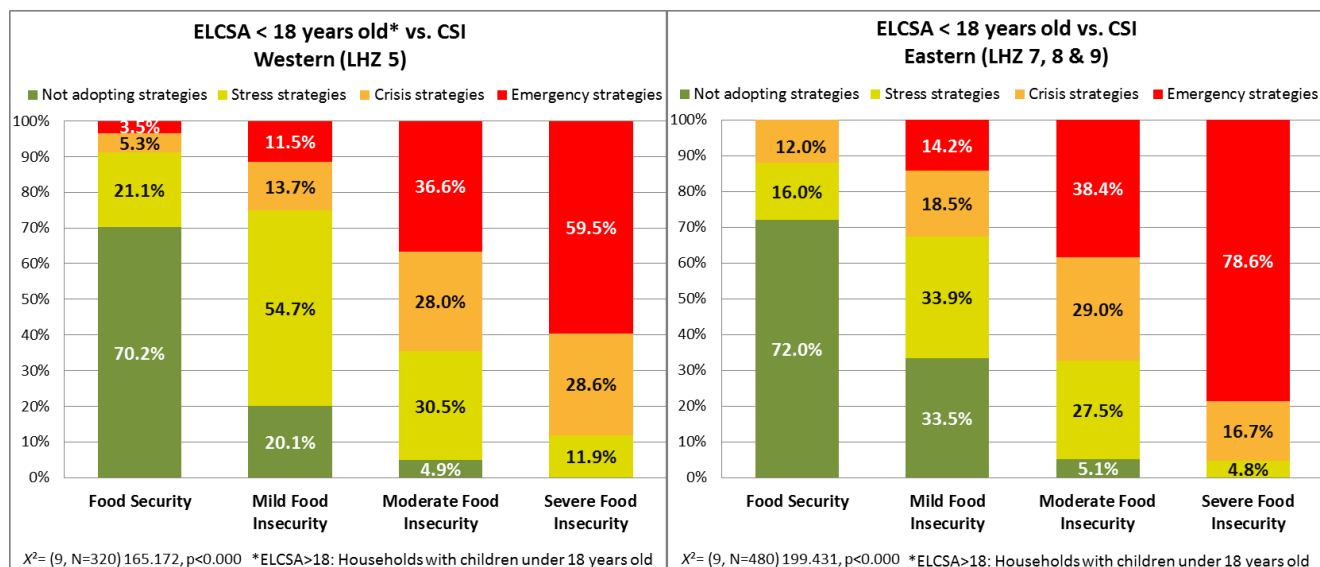
5.4.2 Basic grain reserves

According to the households surveyed, reserves for maize would last a median of 4 (±13.8) weeks in the Western stratum, and 1 (±10.1) week in the Eastern stratum (Figure 17). Bean reserves would last for a median of 0.0 (±9.2) and 0.0 (±9.2) weeks in the Western and Eastern strata, respectively. Moreover, an association between ELCSA <18 and grain reserves was found, with a p<0.000 for maize and p<0.000 for beans.

Figure 17: Maize grain reserves by ELCSA < 18 by stratum, SMART 2015 – ACF
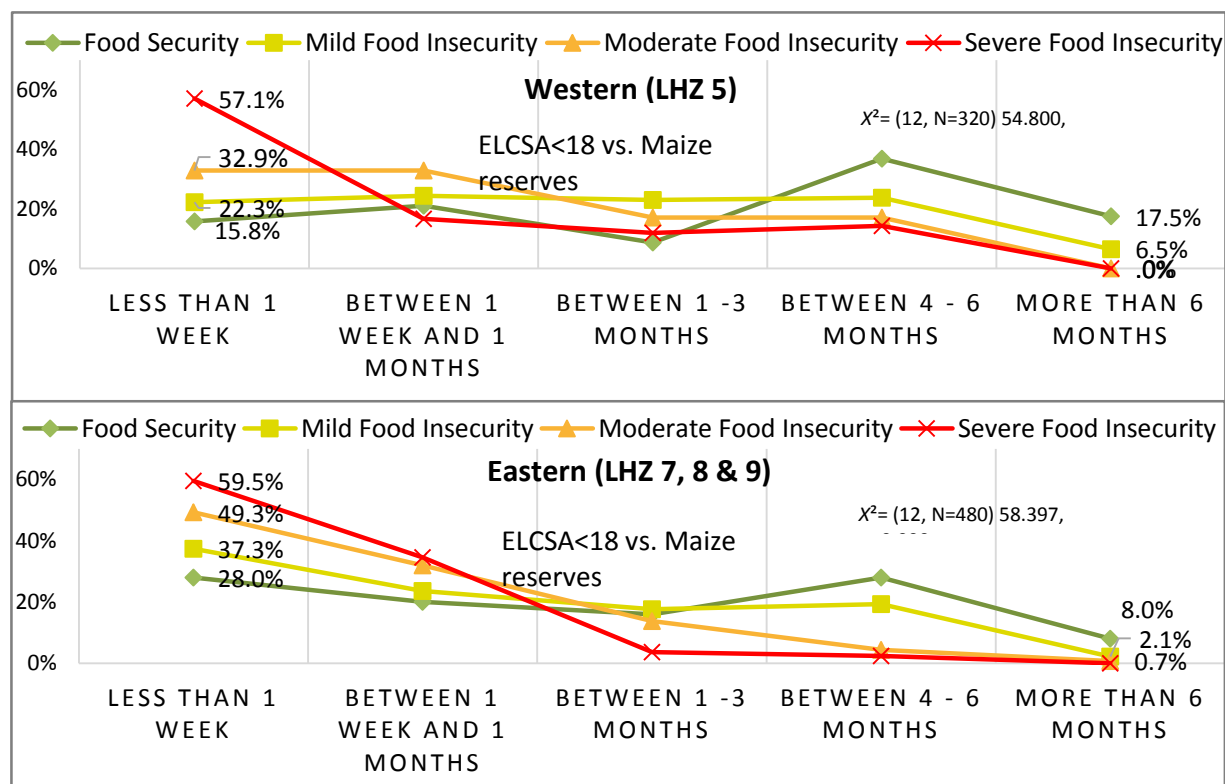
5.4.3 Main sources of income

The main source of income in both the Western and Eastern strata was unskilled day-labor (for 47.1 percent and 66.0 percent of households, respectively), consistent with the livelihood descriptions given earlier. More than three out of four households in the Western stratum and four out of five in the Eastern stratum have only one income source (Figure 18).

Figure 18: Income activities and number of income sources by stratum, SMART 2015 - ACF
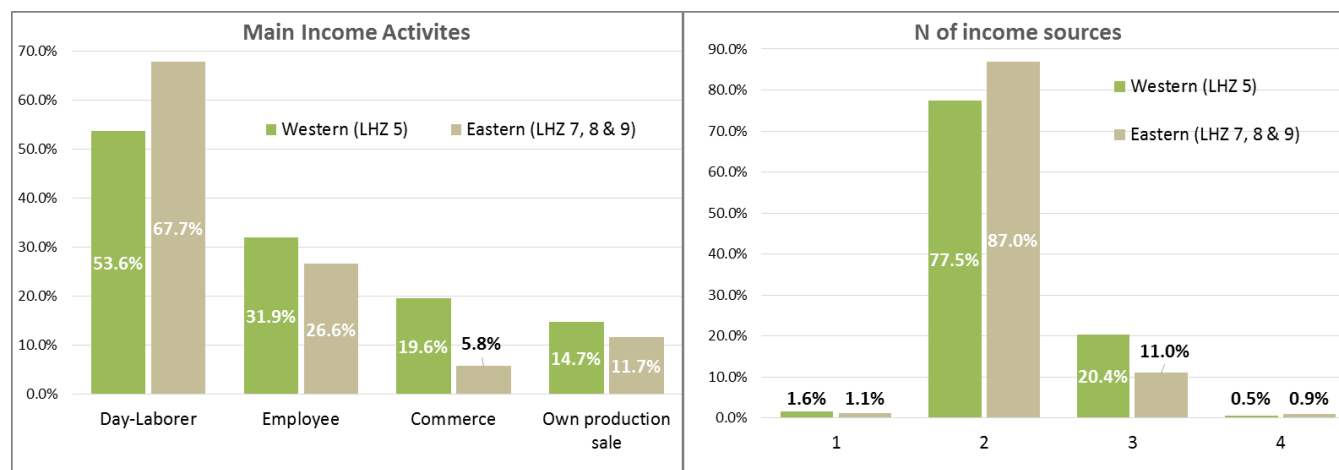
Some significant associations were found regarding ELCSA and main income activities. That is, households that have commercial activity as their main source of income (p=0.001) in the Western stratum tend to have more food security. Likewise, in the Eastern stratum, formal employees (p=0.020) tend to have less severe food insecurity.

Box 3: Present situation and future outlook

As of December 2014, 13.5 percent of households with children under 18 years old in the Western stratum had entered a state of severe food insecurity. Of those, half were already adopting emergency coping strategies and had no basic grain reserves in March 2015.

A similar situation was found in the Eastern stratum, where 17.2 percent of households with children under 18 years old had entered a severe food insecurity situation as of December 2014. Four out of five of those households were adopting emergency coping strategies and almost two out of three did not have grain reserves in March 2015.
The situation found in both strata means that more than half of the **households in severe food insecurity were facing an emergency situation in March 2015**. This situation may continue to deteriorate until August 2015, when the first harvest of the season occurs.

SECTION VI

RECOMMENDATIONS

The following recommendations were discussed with the technical committee and consensus was reached on the most appropriate recommendations given Guatemala's context.

6.1 Community Empowerment

6.1.1 Nutrition education and awareness

The promotion of appropriate feeding practices for small children and infants should be enhanced at the community level. Initiatives should be culturally relevant by including community facilitators, midwives, and pregnant and nursing mothers, and should also include staff from the formal health system (nursing assistants and health center staff).

Education and awareness of optimal IYCF practices should become a guiding principle of programs focused on preventing malnutrition, thus converting the first three actions (promotion of and support for breastfeeding, improvement of complementary feeding after six months, and improvement of hygiene practices, including hand washing) against chronic hunger from the Zero Hunger Pact into guiding principles in the fight against chronic malnutrition.

Key messages should be directed towards:

- Expanding the practice of exclusive breastfeeding for children under six months old, with an emphasis on avoiding practices that put children's health at risk.
- Instructing mothers not to use feeding bottles or to opt for the cup technique, and teaching the necessary hygienic measures to prepare bottles.
- Urging parents to increase meal frequency for children 6-23 months old.
- Teaching parents about foods that provide greater nutrient-density.
- Training families to avoid feeding children under one year the family's food and to gradually introduce the proper complementary foods according to the child's age.

6.1.2 Diagnosis and referral of malnutrition cases

The present survey shows that W/H Z scores and MUAC identified different children in diagnosing GAM. Although Nutritional Recovery Centers currently admit children only on the basis of their W/H Z scores, this report suggests that the protocol for admission should be modified to include children with a low MUAC.

6.1.3 Income diversification

Implementing microcredit programs that promote entrepreneurship and diversify economic activity in communities would provide new sources of income for families. These programs should incorporate training, guidance, and follow-up efforts to guarantee that enterprises have improved efficiency.

In this vein, cash-for-work programs allow beneficiaries to diversify economic activity in their communities and provide new sources of family income. At the same time, they contribute toward community development efforts and support key roles in the community, like that of community facilitators, among others.

While microcredit programs could be aimed at those people with the greatest potential for employability, cash-for-work programs could be targeted at those with less potential, thereby increasing their future potential via community work.

6.1.4 Community Emergency Funds

Cash-for-work programs and economic activity in a community energized by microcredit programs would allow for the creation, through wealth distribution mechanisms, of Community Emergency Funds. These funds could focus on paying or co-paying the travel and treatment expenses of those diagnosed with malnutrition and on promoting access to health care for the most severely ill.

6.2 Food Delivery Programs

Food programs should place the highest priority on households with no or little grain reserves and those without access to land, given their high association with food insecurity.

A transition should be initiated to allow the delivery of food bags to evolve into *cash transfer* and *cash-for-work* programs to promote family autonomy, allow prioritization of household spending, and promote revitalization of the community economy. This would support the Zero Hunger Pact's Action 5 (safety net against seasonal hunger, through a temporary employment program, cash transfer programs, and humanitarian assistance) under Objective 2 (prevent seasonal hunger and reduce mortality rates in children under five due to acute malnutrition).

Furthermore, existing food rations should be accompanied by nutrition education activities, as the aforementioned guiding principle, and by training households on budget management to give beneficiaries the capacity to transition to programs that require more autonomy and education.

6.3 Institutional, Nongovernmental, and Private Initiative Actions

Taking advantage of the 10-year revision of the Food Security Act in May 2015, the integration and effectiveness of the actions planned in the Zero Hunger Pact for different government bodies (especially SESAN, MSPAS, and the Ministry of Agriculture, Livestock and Food/MAGA) should be reviewed.

The technical structure of the aforementioned bodies should ensure follow-up and continuity of these policies (Food Security Act and Zero Hunger Pact) both during and after the political transition, regardless of the 2015 Presidential election results.

At the same time, the necessary resources for implementation of such policies and for restoration of the *Extension of Health Coverage* program, which would guarantee access to health care, should be ensured. The use of emergency funds could prevent situations like the current one.

Likewise, interventions such as growth monitoring and counseling that focus on the 1,000 day window of opportunity should be prioritized. Adequate human, material, and financial resources should be guaranteed so that these programs are as effective as possible.

The coordination mechanism between governmental and nongovernmental institutions for food security and nutrition issues should be strengthened at all administrative levels: national, departmental, and municipal, to avoid duplication of effort and to promote efficiency.

6.4 Food and Nutrition Security Surveillance Network

For continued monitoring of Guatemala's food and nutrition security situation, development of a Food and Nutrition Security Surveillance Network will be encouraged at the community, regional, and national level:

- At the national level, the ENSMI, conducted every four years, could identify the most affected regions.
- At the regional level, cross-sectional surveys like SMART and the EFSA could allow annual monitoring of the regions identified in the ENSMI.

- At the local level, monthly MUAC sweeps in the community, as well as records on the first level of health care, could provide longitudinal data on rates of acute malnutrition.

All of this could be supplemented with Nutrition Causal Analysis in the complex LHZ that are particularly affected and have cultural specificities. This analysis would promote better understanding of the causes of malnutrition and enable better adjustment of programs to each area's particular circumstances.

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ANNEX A

Decision Tree for Household Random Selection

Figure A1: Decision tree for household selection at the last stage of cluster sampling

❌ Pathways not used in this survey.

*A threshold of 150 households was chosen to apply segmentation with Probability proportional to Population Size (PPS) method in this survey.
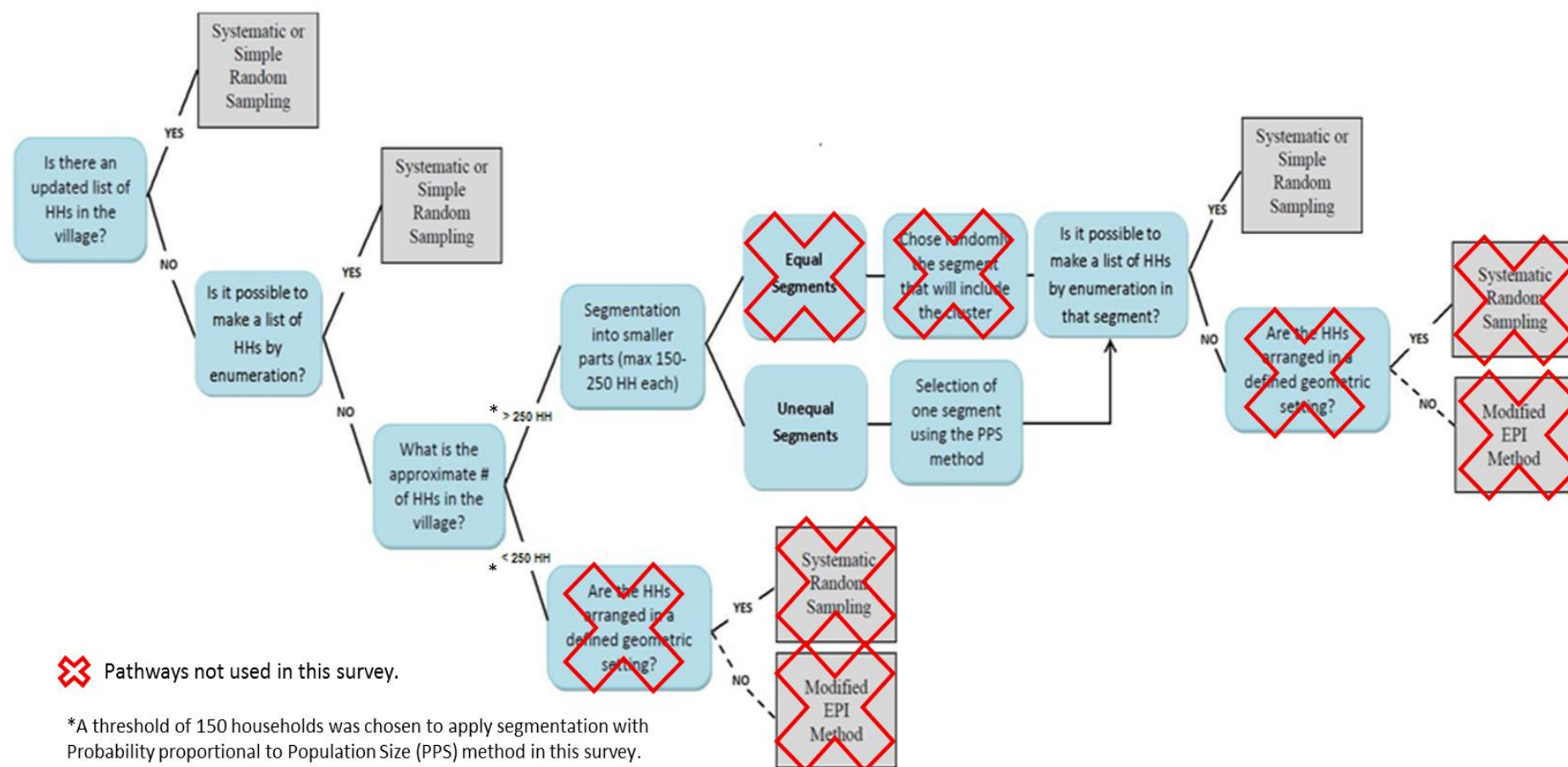
Source: SMART (2012).

ANNEX B

Questionnaire

For this survey, a questionnaire with seven modules was designed:

- Module I: Mortality
- Module II: Food security
- Module III: Grain reserves
- Module IV: Livelihoods
- Module V: Sources of income
- Module VI: IYCF for children 0-23 months old
- Module VII: Nutrition, morbidity, and health for children 0-59 months old

The questionnaire was applied through a personal interview and by taking anthropometric measurements. Absences and interviewees' physical handicaps limited implementation of the questionnaire.

Empty households

At the time of the interview, if members of a selected household were absent, the team spoke with neighbors, seeking information about when members would return. If they returned before the team left the cluster, the household was interviewed. If members did not return before the team left the cluster, the household was noted in the questionnaire as absent, and the questionnaire was not administered; no substitution for the household was made.

Absence of children under five years old

At the time of the interview, if household children under five years old were absent, the team spoke with household members about where the children were and if and when they would return. If children under five years old returned before the team left the cluster, anthropometric measurements were taken. If children under five years old did not return but it was possible to go to the place where they were, the team found the children and took anthropometric measurements in that place. If children did not return and it was not possible to go to where they were, identification data of the children were taken, and the children were noted as pending on the questionnaire and cluster control form. The rest of the questionnaire was applied to the head of the household or caregiver; no substitution for children was made.

Children alone in the household

At the time of the interview, if only children were in the household, the team spoke with them seeking information about when adult members of the household would return. If other members of the household returned before the team left the cluster, the questionnaire was administered. If they did not return before the team left the cluster, the household was noted as absent on the questionnaire and cluster control form; no substitution for the household was made.

Physical handicaps of children under five years old

When children with physical handicaps were found in a household, teams assessed the possibility of taking total or partial anthropometric measurements. However, the identification data of the children were always taken and noted in the questionnaire. If it was not possible to take all or some measurements, these were noted as missing in the questionnaire.

The questionnaire included identifiers for better identification of households and children:

First, the questionnaire started with an introduction of the survey and its objectives and sought the interviewee's authorization to apply the questionnaire (informed consent).

Second, identifier variables for each questionnaire were required: Department, Municipality, name of the cluster, date of the interview, number of the cluster, number of the team, and number of the household.

Finally, household members were identified by including their name in a numbered list. Each member's assigned number became his/her ID number.

The department, number of the cluster, number of the household, and name, sex, and ID number of the children were included in the IYCF and nutrition modules. All these data plus the mother's ID number were also included in the health and morbidity modules.

CUESTIONARIO DE HOGAR - Encuesta SMART 2015

Buenos días, mi nombre es _____, trabajamos con la Fundación Acción Internacional Contra El Hambre para la realización de una evaluación sobre la nutrición de los niños. Quisiera hacerle una preguntas, si me lo permite, sobre su hogar y tomar las medidas de los niños menos de 5 años (como talla y peso), también la circunferencia del brazo de las mujeres del hogar. Toda la información recolectada es confidencial y no se va a compartir con nadie. Este estudio, podrá presentar de manera objetiva la situación del estado nutricional de los niños de la región y permitirá tomar las medidas apropiadas para realizar mejoras. Necesitaría más aclaraciones? Podríamos empezar?

*Codigo Departamento : Huehuetenango (HUE) / Quiché (QUI) / San Marcos (SMA) / Quetzaltenango (QUE) / Totonicapán (TOT) / Sololá (SOL) / Chimaltenango (CHT) / Baja Verapaz (BVE) / El Progreso (ELP) / Zacapa (ZAC) / Jalapa (JAL) / Chiquimula (CHQ) / Jutiapa (JUT)

Departamento (*): _____	Municipio : _____	Comunidad : _____
FECHA (Día): |___|___| / 03 / 2015	Nº Cluster |___|___| Nº Equipo |___|___|	Nº Hogar (Hog) |___|___|

Módulo I - Mortalidad Retrospectiva (desde el 24 de diciembre de 2014)

Nombre	Sexo	Edad en Años	Desde la Navidad (24 diciembre 2014) hasta hoy en su hogar (Hog)				Otras Medidas		Observaciones
			Llegó al Hogar	se fue del Hogar	Ha nacido en el Hogar	Ha muerto en el Hogar	niños (0-49 meses)	Circunferencia LM* (≥ 15 meses)	
Nombre y Apellido	(M=MASC. F=FEM.)	(niños < 1 año, anotar "0")	sector "Y" para su depto en BLANCO por NO.				Persona por medir...		Justificar, porque una persona no fue medida o si hay un inconveniente o una cita para volver al lugar, etc.
							Medidas tomadas...		
							No hay que medir....☐		

A- Listado de todos los miembros "VIVIENDO ACTUALMENTE" en el hogar.

1							☐	☐	
2							☐	☐	
3							☐	☐	
4							☐	☐	
5							☐	☐	
6							☐	☐	
7							☐	☐	
8							☐	☐	
9							☐	☐	
10							☐	☐	
11							☐	☐	
12							☐	☐	
13							☐	☐	
14							☐	☐	
15							☐	☐	
16							☐	☐	
17							☐	☐	
18							☐	☐	
19							☐	☐	
20							☐	☐	

B- Listado de todos los miembros que "SE FUERON DEL HOGAR" desde Navidad pasada (24 de diciembre 2014)

21				Y					
22				Y					
23				Y					
24				Y					
25				Y					
26				Y					

C- Listado de todos los miembros del hogar "QUE MURIERON" desde Navidad pasada (24 de diciembre 2014)

27						Y			
28						Y			
29						Y			
30						Y			

Había alguna embarazada en el hogar durante el período de recordatorio?   No ☐ Si ☐ en caso de "Si", cuántas?

Módulo II - Seguridad Alimentaria (Navidad-Hoy)

Desde Navidad (24 diciembre) hasta el día de hoy, POR FALTA DE DINERO U OTROS RECURSOS:

¿A qué (grupo de personas) se refieren cada preguntas?	Hogar	Adultos	Menores de Edad (<18 años)
¿Alguna vez usted se preocupó porque los alimentos se acabaran en su hogar?	A- |___|		Si=1 No=0 No Sabe=8 N/A =9
¿Alguna vez en su hogar se quedaron sin alimentos?	B- |___|		
¿Alguna vez (grupo de personas) dejaron de tener una alimentación balanceada?	C- |___|		I- |___|
¿Alguna vez usted o algún adulto en su hogar tuvo una alimentación basada en poca variedad de alimentos?		D- |___|	J- |___|
¿Alguna vez usted o algún (grupo de personas) en su hogar dejó de desayunar, almorzar o cenar?		E- |___|	K- |___|
¿Alguna vez usted o algún (grupo de personas) en su hogar comió menos de lo que debía comer?		F- |___|	L- |___|
¿Alguna vez tuvieron que disminuir la cantidad de comida servida a algún menor de 18 años en su hogar?			M- |___|
¿Alguna vez usted o algún (grupo de personas) en su hogar sintió hambre pero no comió?		G- |___|	N- |___|
¿Alguna vez usted o algún (grupo de personas) en su hogar solo comió una vez al día o dejó de comer durante todo un día?		H- |___|	O- |___|

Módulo III - Reservas de Granos (Proyección = Futuro)

A-	¿Tiene reservas de **Maíz** de cuántas semanas para el consumo de su hogar?	A- |___|
B-	¿Tiene reservas de **Frijol** de cuántas semanas para el consumo de su hogar?	B- |___|

Módulo IV- Medios de Vida (7 últimos días = Última Semana)

En los 7 días anteriores, en caso que NO HUBO SUFICIENTE ALIMENTOS O DINERO PARA COMPRAR,
¿Con qué frecuencia su hogar tuvo que: (preguntar por cada estrategia)?

Codificación: No=0, Cuántos días (usar de 1 a 7), No Sabe=8, N/A=9

A-	¿Comer alimentos menos preferidos o más baratos?	A- |___|
B-	¿Contar con alimentos prestados o regalados por amigos o familiares?	B- |___|
C-	¿Comprar alimentos a crédito?	C- |___|
D-	¿Recoger alimentos silvestres, cazar o comer alimentos no maduros?	D- |___|
E-	¿Comer los granos reservados para la próxima siembra?	E- |___|
F-	¿Mandar a miembros del hogar a comer a otro lado?	F- |___|
G-	¿Pedir limosna para comer?	G- |___|
H-	¿Disminuir las porciones de comida?	H- |___|
I-	¿Restringir las porciones de los adultos, a fin de dar preferencia a los niños?	I- |___|
J-	¿Racionar dinero disponible y no cocinar y comprar la comida hecha?	J- |___|
K-	¿Alimentar a los aporta ingresos y cubre los gastos del hogar a costa de los no?	K- |___|
L-	¿Reducir el número de comidas por día?	L- |___|
M-	¿Pasar el día entero sin comer?	M- |___|

Módulo V - Principal Fuente de Ingresos

A. Empleo - Jornal	Si=1 No=0	A- |___|	especificar:
B. Empleo Otro		B- |___|	especificar:
C. Comercio		C- |___|	especificar:
D. Venta de producción propia		D- |___|	especificar:

Observaciones:

Cuestionario Terminado (Verificar que estén completos todos los datos colectados antes de pasar al siguiente hogar).

MÓDULO VI - NIÑOS DE 0 A 23 MESES PRÁCTICAS DE ALIMENTACIÓN DEL LACTANTE Y DEL NIÑO PEQUEÑO (ALNP)	COD_DEPARTAMENTO / CLUSTER / N° HOGAR
	|__|__|__| / |__|__| / |__|__|
	*Código Departamento - Huehuetenango (HUG) / Quiché (QUI) / San Marcos (SMA) / Totonicapán (TOT) / Baja Verapaz (BVE) / El Progreso (ELP) / Zacapa (ZAC) / Jalapa (JAL) / Chiquimula (CHQ) / Jutiapa (JUT)

Código	Cuestiones	Respuesta	Obsevaciones
301	Nombre del niño		
302	Identificación del niño (referirse al módulo Mortalidad para ID)	ID................ |__|__|	
303	Sexo del niño	Masculino......M |__| Femenino......F	
304	Edad del niño en meses	EDAD............. |__|__|	
305	¿Amamantó usted alguna vez a (NOMBRE)?	Sí............1 |__| No............0 (Pasar 309) __|	Con respuesta 'no' pasar directamente a 309
306	¿Cuánto tiempo después del nacimiento puso usted (NOMBRE) por primera vez al pecho?	IMMEDIATO..............000 o HORA(S)............1 |__|__| o DIA(S)............2 |__|__| o NO SABE..............888	5 posibilidades de respuesta: - Menos de 30 min : (000) o - Entre 30 min y 1 hora : 1 |0|0| o - Entre 1 hora y 23 horas : 1 |0|2| (ex: 2h) o - A partir de 1 día o más :2 |0|2| (ex: 2días) o - No Sabe : (888)
307	¿Sigue usted amamantando al día de hoy?	Sí............1 (Pasar 309) __| |__| No............0	Con respuesta 'sí' pasar directamente a 309
308	¿Durante cuánto tiempo estuvo usted amamantando (NOMBRE)?	MESES(S)..............|__|__| o NO SABE..............88	
309	¿Le dieron vitamina A a (NOMBRE) desde el 15 de septiembre 2014 (independencia)?	Sí............1 No............0 |__| No Sabe..........8	Las cápsulas de Vitamina A son de color azul o rojo
RECORDATORIO DE 24 HORAS LAS SIGUIENTES PREGUNTAS SE REFIEREN A LAS COMIDAS Y BEBIDAS INGESTAS EN EL DÍA ANTERIOR A LA ENCUESTA			
310	¿Ahora quiero saber las comidas líquidas que puede haber bebido (NOMBRE) ayer durante el día o la noche?		
A-	Agua	Sí............1 No............0 |__| No Sabe..........8	✕
B-	Fórmulas lácteas infantiles (Nan, Bebelac, Similac Advance, etc..)	Sí............1 No............0 |__| No Sabe..........8	Cuantas Veces..............|__| (Si 7 veces o mas, anotar "7")
C-	Todos otros tipos de leches, leche en polvo (Nido, etc.) leche en caja leche fresca fluida, etc.	Sí............1 No............0 |__| No Sabe..........8	Cuantas Veces..............|__| (Si 7 veces o mas, anotar "7")
D-	Atoles (bebidas de arroz, de avena, etc.)	Sí............1 No............0 |__| No Sabe..........8	✕
E-	Jugo de fruta	Sí............1 No............0 |__| No Sabe..........8	✕
F-	Té, Café o Agüitas (manzanilla, anís, etc.)	Sí............1 No............0 |__| No Sabe..........8	✕
G-	Otros líquidos: Aguas gaseosas, caldos, etc.	Sí............1 No............0 |__| No Sabe..........8	✕
311	¿Estuvo ingiriendo alguna pacha (NOMBRE) ayer durante el día o la noche?	Sí............1 No............0 |__| No Sabe..........8	
El recordatorio de 24 horas sigue en el verso de esta hoja .../...			

312	¿Ahora quiero saber las comidas sólidas o semi-sólidas (tipo papilla o puré) que puede haber comido (NOMBRE) ayer durante el día o la noche?		
A-	Papilla, puré o otro alimento a base de cereales (como arroz, avena, trigo) o con papá, camote dulce, plátano, etc? O comidas como tortilla, pasta, panes (pan de francés, pan de manteca...) bolsitas diana, tamales, maíz, elote dulce...	Sí................1 No................0 |___| No Sabe..........8	
B-	Frijol, maní, arvejas, nueces, etc.	Sí................1 No................0 |___| No Sabe..........8	
C-	Productos lácteos (queso, requesón, crema, etc.)	Sí................1 No................0 |___| No Sabe..........8	
D-	Carnes y pescados	Sí................1 No................0 |___| No Sabe..........8	
E-	Huevos	Sí................1 No................0 |___| No Sabe..........8	
F-	Verduras (tomate, cebolla, ayotes, güisquil, zanahoria, chile pimiento, pepino, remolacha, lechuga, etc.)	Sí................1 No................0 |___| No Sabe..........8	
G-	Frutas (mango, papaya, piña, banano, naranja, limón, sandía, melón, jocote, aguacate, etc.)	Sí................1 No................0 |___| No Sabe..........8	
H-	Aceite vegetal, grasas animal, manteca, etc.	Sí................1 No................0 |___| No Sabe..........8	
I-	Azúcar	Sí................1 No................0 |___| No Sabe..........8	
313	¿Ahora quiero saber cuántas veces (NOMBRE) ha comido las comidas sólidas o semi-sólidas (tipo papilla o puré) ayer durante el día o la noche?	CUANTAS VECES..........|___| O NO SABE.....................8	Si 7 veces o más, anotar "7"

MÓDULO VII - NIÑOS DE 0 a 59 MESES ANTROPOMETRÍA Y SALUD PARA NIÑOS(AS) MENORES DE 5 AÑOS	COD_DEPARTAMENTO / CLUSTER / N°HOGAR
	|__|__|__| / |__|__| / |__|__|
	*Codigo Departamento : Huehuetenango (HUE) / Quiché (QUI) / San Marcos (SMA) / Totonicapán (TOT) / Baja Verapaz (BVE) / El Progreso (ELP) / Zacapa (ZAC) / Jalapa (JAL) / Chiquimula (CHQ) / Jutiapa (JUT)

IDENTIFICACION NIÑOS(AS)		ANTROPOMETRIA (0-59 meses)							Referencia a Centros de Salud de Casos DA
		Llenar una sola columna							
Nombre y Apellido (Hog = Número de hogar en el cuestionario de hogares de 1 hasta 16 / ID = Código personal correspondiente al número de la linea en que aparece esta persona en el cuestionario de hogares)	ID	Sexo (M=Masculino, F=Femenino)	Fecha de Nacimiento (DD/MM/AAAA)	Edad en Meses Obsar únicamente: si no se conoce la fecha de nacimiento	Peso (kg) (00.0)	Talla (cm) (000.0)	Edemas Bilaterales (Y= Si, N=No)	PB (mm) (000) (solo 6-59 meses) Brazo Izquierdo	P/T < -2 Zscore y/o PB < 125 mm y/o Presencia de Edemas Bil. (Y=Yes, N=No)
A									
B									
C									
D									
E									

	Niño pesado ROPA Desnudo con Playera Estandard Cod. [X] = 1	ID Madre	Durante los 15 dias anterior a la encuesta			Durante los 6 ultimos Meses	Para los 12-59 meses
			Diarrea A partir de 3 emision fecal pastosa o liquida por 24h Si= 1 ; No= 0 ; N/S= 8	Fiebre o 'Calentura' Si= 1 ; No= 0 ; N/S= 8	Infección Respiratoria Si= 1 ; No= 0 ; N/S= 8	Desparasitación (Mebendazol) Si= 1 ; No= 0 ; N/S= 8	Vacuna del Sarampión Si con Carnet Salud = 1 Si sin Carnet Salud = 2 No = 0 ; N/S = 8
Sigue el niño --> A	☐						
Sigue el niño --> B	☐						
Sigue el niño --> C	☐						
Sigue el niño --> D	☐						
Sigue el niño --> E	☐						

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ANNEX C

Selected Clusters

WESTERN (LHZ 5)				
CENSUS AREA	DEPARTMENT	MUNICIPALITY	COMMUNITY	CLUSTER
1327046	Huehuetenango	Aguacatan	Rio San Juan	1
1319010	Huehuetenango	Colotenango	Los Naranjales	2
1301009	Huehuetenango	Huehuetenango	Chiquiliabaj	3
1329004	Huehuetenango	San Gaspar Ixchil	Tierra Colarada	4
1331024	Huehuetenango	Santa Ana Huista	Monajil	5
1402028	Quiche	Chiche	Tierra Colorada	6
1406074	Quiche	Chichicastenango	Chunima	7
1406048	Quiche	Chichicastenango	Paxot Iii	8
1407014	Quiche	Patzite	Pachaj	9
1409011	Quiche	San Pedro Jocopilas	Chijolom	10
1401195	Quiche	Santa Cruz Del Quiche	Chocaman Cuarto	11
1401055	Quiche	Santa Cruz Del Quiche	Tabil	12
1204021	San marcos	Comitancillo	Ixmoco	13
1206201	San marcos	Concepcion Tutuapa	Chapil	14
1205019	San marcos	San Miguel Ixtahuacan	La Cumbre	15
1210038	San marcos	Tejutla	10 De Mayo	16
805024	Totonicapan	Momostenango	Choestancia	17
805250	Totonicapan	Momostenango	Panictacaj	18
805203	Totonicapan	Momostenango	Xemuj	19
808288	Totonicapan	S. Bartolo	Xepanqui	20
802017	Totonicapan	S. Cristobal Totonicapan	Xesuc	21
807039	Totonicapan	Sta. Lucia La Reforma	Tzanxan	22
801005	Totonicapan	Totonicapan	Coxom	23
801071	Totonicapan	Totonicapan	Tierra blanca	24

EASTERN (LHZ 7, 8 & 9)				
CENSUS AREA	DEPARTMENT	MUNICIPALITY	COMMUNITY	CLUSTER
1504164	Baja Verapaz	Cubulco	Chivesa	1
1504117	Baja Verapaz	Cubulco	Turbala	2
1503019	Baja Verapaz	Rabinal	Chuaracana	3
2005036	Chiquimula	Camotan	La Libertad	4
2001086	Chiquimula	Chiquimula	El Conacaste	5
2007022	Chiquimula	Esquipulas	Chanmagua	6
2011037	Chiquimula	Ipala	Jicamapa	7
2004042	Chiquimula	Jocotan	Naranjo	8
2006011	Chiquimula	Olopa	La Prensa	9
2009096	Chiquimula	Quetzaltepeque	Yerbabuena	10
2003011	Chiquimula	San Juan Ermita	Zarzal	11
208074	El Progreso	San Antonio La Paz	Estacion Agua Caliente	12
207081	El Progreso	Sanarate	Sinaca	13
2103024	Jalapa	San Luis Jilotepeque	Pansiguis	14
2102022	Jalapa	San Pedro Pinula	El Tobon	15
2204100	Jutiapa	Agua Blanca	Llano Hondo	16
2205112	Jutiapa	Asuncion Mita	Sitio Del Nido	17
2211035	Jutiapa	Comapa	La Laguna	18
2202017	Jutiapa	El Progreso	El Ovejero	19
2201026	Jutiapa	Jutiapa	Casas Viejas	20
2201145	Jutiapa	Jutiapa	Las Pilas	21
2214040	Jutiapa	Moyuta	Los Achiotes	22
2206028	Jutiapa	Yupiltepeque	Las Brisas	23
1402003	Quiche	Chiche	La Trinidad Buena Vista	24
1412035	Quiche	Joyabaj	Los Tecomates O Himares	25
1416021	Quiche	Sacapulas	Chibuc	26
1414035	Quiche	San Andres Sajcabaja	Sacaj	27
1404010	Quiche	Zacualpa	Potrero Viejo	28
1904068	Zacapa	Gualan	La Cartuchera	29
1909020	Zacapa	La Union	Joconal	30
1908004	Zacapa	San Diego	El Terrero	31
1901038	Zacapa	Zacapa	Jumuzna	32

ANNEX D

References for Assessing Malnutrition and Mortality

The following thresholds were used to assess the severity of malnutrition and mortality and the excess of mortality:

Table D1: Classification for assessing severity of malnutrition by prevalence ranges among children under five years of age

Severity of malnutrition	Malnutrition indicators			
	GAM	SAM	STUNTING	UNDERWEIGHT
Low	< 5 %	=0%	< 20 %	< 10 %
Medium	5 - 9 %	0 - 1 %	20 - 29 %	10 - 19 %
High (Alert)	10 - 14 %	1 -2 %	30 - 39%	20 - 29 %
Very high (Emergency)	> 15 %	> 2%	> 40 %	> 30%

Source: WHO (1997; 2000).

Table D2: Thresholds for assessing severity of mortality

Severity of Mortality	Mortality indicators	
	CDR (10,000/pers./day)	U5DR (10,000/children/day)
Minimal	< 0.5	≤ 1
Stressed	< 0.5	≤ 1
Crisis	0.5 - 1	1 - 2
Emergency	1 - 2	2 - 4
Famine	> 2	> 4

Source: IPC Global Partners (2012).

Table D3: Thresholds for assessing excess of mortality

Region	CMR (deaths/ 10,000/ day)	CMR emergency threshold	U5MR (deaths/ 10,000/ day)	U5MR emergency threshold
Sub-Saharan Africa	0.41	0.8	1.07	2.1
Middle East and North Africa	0.16	0.3	0.27	0.5
South Asia	0.22	0.4	0.46	0.9
East Asia and Pacific	0.19	0.4	0.15	0.3
Latin America and Caribbean	0.16	0.3	0.15	0.3
Central and Eastern European region/CIS* and Baltic States	0.33	0.7	0.14	0.3
Industrialised countries	0.25	0.5	0.03	0.1
Developing countries	0.22	0.4	0.44	0.9
Least developed countries	0.33	0.7	0.82	1.7
World	0.25	0.5	0.40	0.8

Source: Sphere Project (2011).

ANNEX E

Inquiry Over the Coping Strategies Index

The process of assigning each item to a coping strategy category was done with a food security specialist and validated by the WFP. The item "Reduce the number of meals eaten in one day" presented a high prevalence for an emergency coping strategy. Thus to ensure the quality of the indicator and to verify whether this item should be placed in the emergency category or the crisis category, an inquiry was held with MAGA field workers.

MAGA field workers working in clusters with a high prevalence for this item were asked three questions:

- Are the households of the community applying the coping strategy: "Reduce the number of meals eaten in a day"?
- Is it a normal strategy for the date of March 2015?
- Is it a normal strategy for this community in particular?

A summary of the responses is presented in Table E1:[14]

Table E1: Summary of MAGA field workers answers regarding the CSI

Strata	Department	Municipality	Community	Cluster	It have been applied	It is normal for the date	It is normal for the place
Western (LHP 5)	Huehuetenango	Huehuetenango	Chiquiliabaj	3	NO	N/A	N/A
		San Gaspar Ixchil	Tierra Colarada	4	YES	NO	DK/DA
	Quiche	Chiche	Tierra Colorada	6	DK/DA	DK/DA	DK/DA
Eastern (LHZ 7, 8 & 9)	Chiquimula	Jocotan	Naranjo	8	YES	NO	YES
		Olopa	La Prensa	9	YES	NO	YES
	Quiche	Joyabaj	Los Tecomates O Himares	25	YES	NO	NO
		Sacapulas	Chibuc	26	NO	N/A	N/A
		San Andres Sajcabaja	Sacaj	27	DK/DA	DK/DA	DK/DA

* DK/DA: Do not know / Do not answer

Most of MAGA's field workers said that reducing the number of meals eaten in one day was not a normal coping strategy. This behavior was expected due to the drought shocks experienced by the population during the previous years in a consecutive form and the delay in MAGA's assistance. Based on their answers, the consensus reached with the food security specialist was to keep this strategy categorized as an emergency coping strategy for this survey's analysis.

[14] *This is a simplified table, categorizing the answers given by MAGA field workers.*

ANNEX F

Human Resources

Four different human resources roles were established for this survey:

1. Validation and support: To ensure appropriate survey procedures were followed, to facilitate coordination with municipalities and other governmental actors, and to participate in the design of the survey.

2. Technical support: To provide technical advice regarding survey implementation and to clarify context-related issues regarding the indicators and data collection.

3. Coordination: For general survey implementation, to oversee the feasibility and quality of the survey in the field; and to ensure coordination with authorities, set up survey planning, guarantee the quality of the data collected, and monitor the adequate performance of the field teams.

4. Implementation: To collect data in the field (enumerators/team members), including applying the questionnaire and gathering all relevant data.

Figure F1: Organigram of human resources, SMART 2015 - ACH
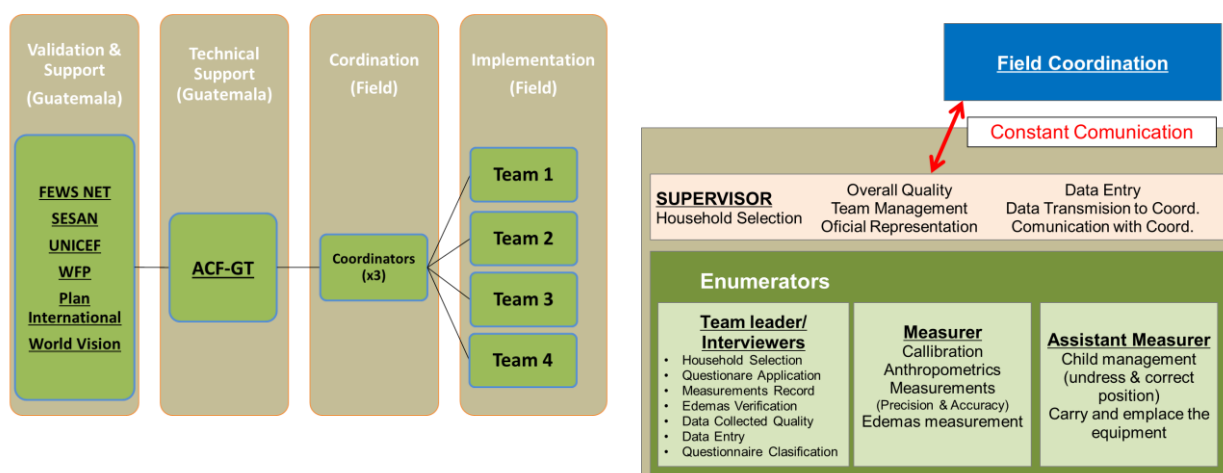
Field teams comprised five members: assistant measurer, measurer, team leader/interviewer, supervisor, and driver. Three coordinators were also assigned to ensure the survey's feasibility and the data quality.

Coordination meetings occurred every day between coordinators and supervisors, either in person when logistics allowed for it or by phone if teams were dispersed throughout the survey area. Likewise, group meetings were performed once a week with all team members in attendance to exchange experiences and doubts and to provide feedback to the teams.

Table F1: List of field team members

Team	Position	Name	Sur Name
Field, Coordination, and Validation Teams Contact List SMART Survey - March 2015, Guatemala			
Supervision Team	Supervisora 1	Adela	Perez Amador
	Supervisora 2	Ana Gabriela	Ixquiac Díaz
	Supervisora 3	Irma Angélica	Amézquita López
Team 1	Entrevistador/Jefe de Equipo	Cornelio	Macz
	Antropometrista	Neftali Nikté Manuela	Simaj Cotiy
	Antropometrista Asistente	Asvel	Gonzalez
Team 2	Entrevistador/Jefe de Equipo	Nadia Victoria	Hernández Sazo
	Antropometrista	Nicolás	Xicay Buch
	Antropometrista Asistente	Milissa Stefania	Siliézar Aroche
Team 3	Entrevistador/Jefe de Equipo	Liliana Elizabeth	Guzmán Romero
	Antropometrista	Julia Aracely	Xitumul Canahuì
	Antropometrista Asistente	Ana Lucia	Aldana Garcia
Team 4	Entrevistador/Jefe de Equipo	Corina Susibel	Ortiz González
	Antropometrista	Olga Patricia	Samayoa Argueta
	Antropometrista Asistente	Graciela Noemí	Maldonado Maldonado
ACH	Coordination	Damien	Pereyra
	Coordination	Julian	Ibarguen
	Coordination	Jessica	Coronado
	Coordination	Victoria	Mendoza
FEWS-NET	Validation	Gilda	Walter
	Validation	Gabriela	Juarez
SESAN	Validation	Nidia Alejandra	Ramirez
PMA	Validation	Eunice	Lopez
UNICEF	Validation	Alejandra	Toledo
PLAN INTERNATIONAL	Validation	Sandra Margarita	Sandoval
WORLD VISION	Validation	Rita	Franco

ANNEX G

Comparability of the Survey

During the review of secondary sources, several studies were found for comparison purposes. Despite the similarities among these studies and the present one, some differences were found that should be taken into account:

In SESAN et al. (2013) anthropometric results were presented for children 6-59 months old; although almost the same LHZ were included in the survey (5, 7, 8, and 9), LHZ 6 and 11 were also included. Data were collected during the months of October – November 2012.

SESAN (2015) was used to provide information regarding the quality of health services. This survey offers nationally representative data. Data on the quality of health centers was taken at the national level, while data on the *Extension of Health Coverage* program was taken by department, including those included in the present survey. To this point, for Quiche department, which spans both strata, the percentage of the total population that corresponded to each stratum was calculated and used to weight the data for each stratum.

Although the stratification used by WFP et al. (2014) did not follow the LHZ established by FEWS NET (2009), it included almost all of the same departments as the present survey,[15] and also differentiated between the Western and Eastern strata. Data for this survey were collected in September 2014. Moreover, sampling for this survey targeted households that had less than one *manzana* of land (equivalent to 0.79 hectares or 1.73 acres) and children 0-59 months of age, who were included to determine GAM prevalence. GAM prevalence results for WFP et al. (2014) were higher than for the present survey.

Data from the MSPAS (2015) were used to identify tendencies within morbidity indicators for 2015, in particular for diarrhea and respiratory infection. Data consisted of cases registered, so it was not possible to calculate prevalence and underreporting was likely to be present. The number of morbidity cases in all the municipalities used for the analysis in the present survey comes from the Ministry of Health's Epidemiological Weeks for 2015.

MSPAS (2010) was used to compare IYCF indicators and malnutrition prevalence. Data were collected between October 2008 and June 2009; malnutrition prevalence targeted children 3-59 months old and rural malnutrition prevalence was used as a reference. These data should be interpreted carefully as MSPAS only obtained the national prevalence, while the present survey is only representative of the Western and Eastern strata.

INE's (2011) ENCOVI (National Survey of Living Conditions) was compared with the ELCSA. Data for this survey were collected between March and August, 2011, during the lean period; higher levels of food insecurity were thus expected in the ENCOVI. Only national-level data were available.

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[15] Baja Verapaz, Chiquimula, El Progreso, Jalapa, Jutiapa, Santa Rosa, and Zacapa for the Eastern stratum and Chimaltenango, Huehuetenango, Quiche, Retalhuleu, San Marcos, Sololá, Suchitepéquez, and Totonicapán for the Western stratum.

ANNEX H

Survey Quality

The standard deviation (SD) of each anthropometric indicator in each strata was generally between ±0.8 and ±1.2. Only the H/A of the Eastern stratum was above ±1.2 SD (±1.25), or ±0.05 SD over the SMART requirements for the distribution of measures.

Table H1: Distribution, atypical data, and design effect for nutrition indicators

| Strata | Indicator | N* | Z-score | | | Design Effect (z-score < -2) |
			Mean ± SD	Not available	Excluded** (Flags)	
Western (LHZ 5)	W/H	237	-0.18±0.80	3	3	1.00
	H/A	276	-2.41±1.13	0	4	3.52
	W/A	275	-1.47±0.89	3	2	2.20
Eastern (LHZ 7, 8 & 9)	W/H	387	-0.07±0.97	1	3	1.12
	H/A	415	-1.96±1.25	0	7	3.82
	W/A	414	-1.18±1.05	1	7	3.01

*Population 6-59 months (W/H) and 0-59 months (H/A & W/A) **SMART Flags [-3Zsc;+3Zsc]*

"Excluded" or "Not available" data represented less than 2.5 percent for each indicator in each strata: the highest missing data rate was for W/H in the Western strata (2.5 percent); the lowest was for W/H in the Eastern strata (1.0 percent).

Finally, the highest design effects were for the H/A indicator in both strata, at 3.52 for the Western strata and 3.82 for the Eastern strata. The lowest design effect was for the W/H indicator in the Western strata.

Table H2: Distribution of sex by age group and ratio of boys/girls

| Strata | Sex | Age Groups (0-59 months) | | | | | Total | Age exact* | Ratio B/G |
		0-11	12-23	24-35	36-47	48-59			
Western (LHZ 5)	Boys	23	34	30	22	25	134		
	Girls	41	32	17	23	33	146	**99%**	**0.92**
	Total	**64**	**66**	**47**	**45**	**58**	**280**		
Eastern (LHZ 7, 8 & 9)	Boys	37	47	39	47	45	215		
	Girls	38	44	47	39	39	207	**100%**	**1.04**
	Total	**75**	**91**	**86**	**86**	**84**	**422**		
2 Strata	**Boys**	**60**	**81**	**69**	**69**	**70**	**349**		
	Girls	**79**	**76**	**64**	**62**	**72**	**353**	**99%**	**0.99**
	Total	**139**	**157**	**133**	**131**	**142**	**702**		
	Ratio B/G	**0.76**	**1.07**	**1.08**	**1.11**	**0.97**	**0.99**		